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# Effects of Stage I Vapor Recovery Regulations on Small Bulk Plants and on Air Quality in the Washington, DC, Baltimore, MD, and Houston/Galveston, TX Areas

Pacific Environmental Services, Inc, Santa Monica, Calif.

**Prepared for**

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16. ABSTRACT

This study surveyed bulk plant operations in areas surrounding Baltimore, MD, Washington, D.C., and Houston/Galveston, TX. It was performed to determine whether the descriptive, market and economic data presented in an earlier report adequately applied to other areas of the country. For these specific locations data was obtained to:1)Provide an inventory of bulk plants and classify these plants by thoughput. 2) Describe facilities and vapor recovery equipment at the bulk plants. 3)Determine types of customers and volume dispensed to non-exempt accounts, agriculture accounts and accounts with small tanks.
4)Financial profile of typical bulk plants.

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# STAGE I VAPOR RECOVERY AND SMALL BULK PLANTS IN WASHINGTON, D.C., BALTIMORE, MD., AND HOUSTON/GALVESTON, TX.

U.S. ENVIRONMENTAL PROTECTION AGENCY
Office of Enforcement
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FINAL REPORT

# EFFECTS OF STAGE I VAPOR RECOVERY REGULATIONS ON SMALL BULK PLANTS AND ON AIR QUALITY IN THE WASHINGTON, D.C., BALTIMORE, MD. AND HOUSTON/GALVESTON, TX. AREAS

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March 1977

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# I. PROJECT BACKGROUND AND SCOPE

Environmental Protection Agency (EPA) regulations for the storage and transfer of gasoline require bulk plants in certain specified air quality control regions to control hydrocarbon emissions from their operations. Vapor recovery systems are to be installed and operated in a manner that will prevent release to the atmosphere of no less than 90 percent by weight of organic compounds in vapors generated during gasoline transfer operations. Individual states have submitted control strategies in State Implementation Plans and enacted laws which frequently provide for the exemption of small bulk plants from hydrocarbon emissions control regulations. Conditions for granting these exemptions are not uniform among the states, e.g., throughput limits often differ. The rationale for allowing exemptions has generally been based on the anticipated adverse economic impact to the industry or on the estimated minor contribution of bulk emissions to the area wide hydrocarbon/oxidant levels.

In order to determine whether Federal vapor recovery regulations need revision, the Division of Stationary Source Enforcement (DSSE) contracted with Pacific Environmental Services, Inc. (PES) to perform a preliminary investigation of the impact of vapor recovery regulations on small bulk plants. This first study focused on bulk plants in the San Joaquin Valley and San Diego California areas and the Denver, Colorado area. The results of this task, reported in "Economic Analysis of Vapor Recovery Systems on Small Bulk Plants," describe the following aspects of gasoline bulk plants.

1. Average gasoline throughput and range of throughputs.
2. Average cost of installing bottom loading vapor balance systems on the bulk plant tanks, loading rack and trucks.
3. Financial profiles of classes of bulk plants.
4. Short term economic impact of installing vapor control equipment.

This current study is a similar survey of bulk plant operations in the specific areas surrounding Baltimore, Md. and Washington, D.C. and Houston/Galveston, Tx. It is being performed to determine whether the descriptive, market and economic data presented in the earlier report can be adequately applied to other areas of the country. Therefore the tasks to be completed are quite similar:

1. Provide an inventory of bulk plants.
2. Describe facilities and vapor recovery equipment at the bulk plants.
3. Classify these bulk plants by throughput.
4. Determine types of customers and volume dispensed to non-exempt accounts, agricultural accounts and accounts with small tanks.
5. Determine the financial profile of typical bulk plants.
6. Estimate the long and short term economic effects of installing and maintaining vapor recovery equipment, particularly with respect to the number of anticipated plant closures or plant start-ups.
7. Estimate emissions from bulk plant operations and the decrease in emissions if controls are adopted.

All information obtained in these tasks is to serve as a basis to determine if there is a specific gasoline throughput below which gasoline bulk plants should not be required to install vapor recovery systems for incoming or outgoing gasoline shipments.

# II. SUMMARY

Inventories of gasoline bulk plants were generated for the Baltimore and National Capital AQCRs (56 plants) and for the Houston/Galveston AQCR (70 plants). Similarities between these plants and facilities in the San Diego and San Joaquin Valley areas of California and the Denver, Colorado area, which were inventoried by PES in an earlier study (1), were examined by comparing storage capacity, number of delivery trucks, gasoline throughput, volume of other products and services, types of customers, vapor recovery system costs and their financial impact. A comparison of plant operations in these four areas is given in Table II-1.

A typical bulk plant, covered in this inventory, would be a wholesale gasoline distributor who receives his supply solely by truck and has an average plant throughput of about 5,000 gallons (20,000 l.) per day. The bulk plant provides direct product delivery to the customer and is usally located in or near a small town rather than in a large urban area. Although bulk plants frequently market petroleum distillates other than gasoline, this study has been limited to the gasoline marketing segment of the industry. Hydrocarbon emissions from such plants are associated with (1) transfer of gasoline from the delivery trailer to storage tanks at the bulk plant, (2) breathing losses from daily temperature changes at the storage tank, (3) transfer of gasoline from the storage tank to the bulk plant delivery truck, and (4) miscellaneous events such as spillage and leakage at valves, hatches and piping joints. Emission controls are designed to recover the vapors displaced from the empty storage tank and return them to the delivery trailer or to recover the vapor displaced from the empty bulk plant delivery truck and return them to the plant storage tank. Breathing losses can be reduced by using pressurized tanks.

## Table II-1. SUMMARY OF SMALL GASOLINE BULK PLANT OPERATIONS

| Areas | No. of Bulk Plants | Gasoline Storage Tanks | | | | Ave. Storage Capacity Liters[a] x10⁻³ | % Plants with Vapor Recovery on Incoming Loads | Outgoing Loads | | | | | Customers Accounts | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Average Gasoline Throughput Liters/day[a] | Ave. No. of Tanks | % Plants with Aboveground Storage | % Plants with Underground Storage | | | % Top Loading | % Bottom Loading | Ave. No. of Trucks | % Plants with Submerged Filling | % Plants with Vapor Recovery | % Throughput Agricultural | % Throughput Small Tanks[c] |
| San Diego/San Joaquin Valley Areas | 218 | 21,400 | 3.2 | 66 | 28 | 183 | 58 | 90 | 10 | 2.2 | 74 | 9 | 64 | ~77 |
| Denver Area | 45 | 19,200 | 3.5 | 79 | 21 | 142 | 18 | 92 | 8 | 1.7 | 85 | 7 | 44 | ~69 |
| Baltimore/ Washington, D.C Area | 56 | 16,900 | 3.0 | 45 | 55 | 192 | 37 | 96 | 4 | 2.1 | 67 | 0 | 46 | 79 |
| Houston/ Galveston Area | 70 | 31,600 | 3.5 | 80 | 20 | 182 | 75 | 90 | 10 | 2.0 | 34[b] | 46 | ~25 | ~50 |

[a] liters/3.7854 = gallons

[b] Submerged fill pipes in the trucks and not on the loading racks. If only properly equipped trucks are used to haul gasoline, then submerged filling becomes a more effective pollution reducing technique

[c] Less than 7,800 l. (2,000 gal) capacity, including agricultural tanks

Although bulk plant operations are basically quite similar in these several areas of the county, there are some noteworthy regional differences.

First, the average daily gasoline throughput at a bulk plant in Houston/Galveston is significantly greater than in other parts of the country. Also, more of that gasoline is going to non-exempt accounts. This increases the potential amount of emissions a given uncontrolled plant could generate during routine operations.

In all areas studied, most of the gasoline is delivered from the bulk plant to accounts with small tanks, i.e., less than 2000 gal capacity (7600 l.). Also, in all areas, a reasonably large portion of that gasoline reaches agricultural users. One reason so much gasoline dispensed through bulk plants does go to small accounts is that customers with larger tanks, which would be non-exempt, are able to receive deliveries directly from transports which have been loaded at terminals.

Average storage capacity in the Denver area is less, which means more frequent deliveries. It should also be noted that only a few plants have installed vapor controls for incoming gasoline shipments in this area.

The amount of underground storage around Baltimore and Washington, D.C. is substantial. This is an effective means of reducing tank breathing losses. Also, plants in the eastern United States deal much more heavily in distillates because so many people use #2 fuel oil for heating.

Only in sections of California and around Houston/Galveston has there been substantial progress in controlling hydrocarbons emitted when bulk plants receive transport deliveries of gasoline. Efforts to recover vapors when small delivery trucks are filled have been minimal except near Houston/Galveston.

The average cost to install a vapor balance system to recover hydrocarbons from deliveries to the bulk plants was found to be $3,500. This corresponds with data previously reported (1, 2). The cost and equipment requirements to recover hydrocarbons from the filling of delivery trucks at the bulk plant loading rack have not yet been suitably resolved. This is primarily because two distinct, different vapor recovery systems are being installed: top loading vapor recovery systems and bottom loading vapor recovery systems.

The equipment being used in the Houston/Galveston area for major oil company owned bulk plants appears to demonstrate that top loading vapor recovery equipment is feasible, effective and affordable. The average cost of adapting a loading rack and an outgoing delivery truck at plants surveyed in this study was $7,000. (Details are provided in Section IV. To substantiate these data, additional, more detailed investigations of the cost, equipment requirements and system efficiency of top loading vapor recovery systems are underway).

Bottom loading vapor recovery systems will be substantially more expensive than top loading systems. The only facility contacted in this study which had installed a bottom loading system provided these costs for work done in 1974:

1) converting the loading rack
   $21,000
2) converting two small delivery trucks
   $10,500

Bulk plants are paricularly interested in a bottom loading system because, even though the initial expense can be much greater than a top loading system, modernizing the loading operation makes it simpler, safer, faster and thereby potentially more profitable.

If the bulk plant is found to be responsible for installing vapor recovery devices on his customers' non-exempt tanks, the operator could, at an average cost of $400 per tank, need to spend as much as $20,000; whereas, a customer would be unlikely to have to spend more than $2,000.

Sufficient data on operating and maintenance costs were not available for any meaningful discussion.

The financial impact of vapor recovery regulations on a small bulk plant depends primarily on the ability of the owner to obtain funds for the initial investment in equipment. Analysis indicates the smallest size operation which could qualify for the loans needed to purchase and install a top loading vapor balance system which costs $10,000 for trucks, tanks and loading rack would have to have an annual throughput of 600,000 gallons (2,300,000 liters). This study showed that 40% of the plants in the Baltimore and National Capital AQCRs and 6% of the plants in the Houston/Galveston AQCR have throughputs below this level. An earlier study performed by PES showed that 25% of the plants in the San Diego, San Joaquin Valley and Denver AQCRs also have annual throughputs below 600,000 gallons (2,300,000 liters). A spokesman for a major oil company stated 1,000,000 gallons/year (3,800,000 liters/year) throughput should be the minimum gasoline sales volume before a bulk plant could be considered profitable. Owners with business volumes between these two numbers are going to have to make a business judgement about how compliance with vapor recovery regulations will affect them economically. Bulk plant operators interviewed in this study were asked what cost levels would constitute undue economic hardships and thereby cause them to either close their bulk plant or discontinue bulk plant gasoline sales. Based upon these responses, Table II-2 was prepared. As can be seen, those facilities with daily throughputs of less than 4,000 gal. (15,000 l.), which is equivalent to an annual throughput of less than 1,040,000 gal.

(3,940,000 l.), would be those most likely to not be able to cope with the economic stress imposed on them as a result of installing vapor recovery. An overall closure rate of 25% is quite possible.

Table II-2. ESTIMATED NUMBER OF PLANTS TO BE AFFECTED BY VAPOR RECOVERY REGULATIONS AND PROBABLE COMPLIANCE

| Type of facility affected by throughput level | Number of Plants | | | | |
|---|---|---|---|---|---|
| | | Already in Compliance | | Not in full compliance | |
| | Required to comply | Phases I & II | Phase I only | Probably would close | Probably[a] would comply |
| | | Houston/Galveston AQCR | | | |
| ≥20,000 gal/mo. | 70 | 22 | 47 | 16 | 32 |
| ≥4,000 gal/day | 54 | 22 | 42 | 0-8 | 24-32 |
| ≥6,000 gal/day | 43 | 20 | 33 | 0 | 23 |
| ≥2,000 gal/day to non-exempt accounts | 32 | 6 | 11 | 0-2 | 24-26 |
| | | Baltimore and National Capital AQCRs | | | |
| ≥20,000 gal/mo | 45 | 1 | 18 | 11-16 | 28-33 |
| ≥4,000 gal/day | 25 | 0 | 14 | 2-6 | 19-23 |
| ≥6,000 gal/day | 15 | 0 | 8 | 0 | 15 |
| ≥2,000 gal/day to non-exempt accounts | 14 | 1 | 14 | 0 | 14 |

[a] Phases I and II

# III. BULK PLANT OPERATION

## A. INTRODUCTION TO THE INDUSTRY AND OVERALL CHANGES IN THE INDUSTRY

An industry overview has been presented in previous reports (1, 2); therefore, only a brief summary will be given here.

A small bulk plant has been considered to be a wholesale gasoline distributor who receives his supply solely by truck and has an average plant throughput of less than 20,000 gal/day (76,000 l/day). Although the bulk plants frequently also market distillates, agricultural supplies or automotive supplies, this study has been intentionally limited to examine only the gasoline distributing segment of the bulk plant industry. Figure 1 is a schematic of the gasoline distribution network which relates to bulk plants. The bulk plant functions primarily to provide the service of direct product delivery to the customer. With very few exceptions bulk plants and their customers are located in or near smaller cities and towns, quite removed from dense metropolitan areas.* The marketing technique of major concern in this study involves four steps: 1) gasoline is transported from the terminal to the bulk plant in trailers of 8,000 gal. (30,000 l.)capacity; 2) the gasoline is transferred from the trailer to storage tanks at the bulk plant; 3) gasoline is pumped through a loading rack into compartmented delivery trucks of 1000 to 3,000 gal. (4,000 to 12,000 l.) total capacity; 4) these smaller trucks then deliver to the customers' tanks. Deliveries from small trucks are generally made to customers who have, 1) tanks with a capacity between 125 and 2,000 gal (500 to 7,600 l.); 2) variable demand and require prompt delivery and 3) tanks located away from improved roadways or in other limited access areas.

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*Locations and numbers of bulk plants in the three AQCRs of interest are shown in Figures 2 and 8

Typical customers who would receive these smaller volumes of gasoline include farms, "Mom and Pop" type service stations, and commercial accounts such as vehicle fleet operators.

A consumer with a high volume throughput and storage tanks large enough to accommodate a major portion of a 8,000 gal (30,000 l.) load of gasoline may buy directly from the terminal or he may place an order with a bulk plant. In the Baltimore/Washington, D.C. areas, the majority of independent jobbers owned a large transport. This allows the bulk plant operator greater latitude in scheduling when, where and how much gasoline could be delivered either to the bulk plant or to customers. For example, a school bus fleet owner with a 4,000 gal (15,000 l.) tank could probably not get a major oil company owned transport to make about a 50 mile (80 km.) round trip from the terminal to deliver only a portion of the transport capacity at a time most convenient to the customer. If this customer places an order with the bulk plant, the bulk plant could transport a full load of product from the terminal, deliver directly to this customer and perhaps one or two others who are nearby to empty the transport. Thus, it is possible for the independent bulk plant operator to completely bypass the bulk plant storage and loading facilities.

In this study a significant amount of gasoline was found to be distributed in this manner to account with large tanks, e.g., service stations or fleet operators. The bulk plant operators have been aggressively acting to increase the amount of gasoline sold by direct haul from the terminal to the customer. Direct hauling of gasoline is more profitable because the cost of two transfer operations are eliminated. Also, the operators believe they may be able to comply with current state requirements to refill vapor laden delivery vessels only at facilities equipped with a vapor recovery system by bypassing the bulk plant and hauling direct from the major terminal which is equipped with vapor recovery.

Gasoline bulk plants are diminishing in importance as a major method of marketing gasoline. Comparing 1972 Census Data (8) with the 1975 and 1976 National Petroleum News marketing surveys ( 9 ,10) indicates a closure of approximately 3,700 bulk plants nationwide in these four years. Of the 1810 plants which closed between 1975 and 1976, almost all were affiliated with major oil companies. Commission agent operated bulk plants are frequently offered for sale to the agent. If the operator does not elect to purchase the plant and become an independent jobber, the facility will generally be completely dismantled.

Reduced profitability in gasoline sales has been a universal complaint of bulk plant operators. The most frequently heard comments were, 1) gasoline allotments have not increased in the past few years; 2) the purchase price of gasoline at the terminal has increased; 3) delivery and operating costs have increased; 4) gross margins have remained the same; 5) competition effectively prevents price increases; 6) discount price self service stations are retailing gasoline at nearly the same price a bulk plant must charge; 7) the cost of complying with spill prevention and control regulations and vapor recovery control requirements has resulted in varying degrees of hardship to the operators and 8) FEA regulations -- 10 CFR 212.93A and B and 10 CFR 205.D -- effectively prohibit passing along any non-product cost, such as vapor recovery, to the customer.

## B. BULK PLANTS IN BALTIMORE AND NATIONAL CAPITAL AQCRs

### 1. Description of Bulk Plants Surveyed

Names and addresses of all bulk plants within the Baltimore and National Capital AQCRs are given in Appendix A. Their locations are shown in Figure 2, a map of both AQCRs.

Both the Maryland Bureau of Air Quality and Noise Control and the Virginia State Air Pollution Control Board have compiled descriptions of all bulk plants listing, 1) the plant gasoline throughput; 2) numbers and types of tanks; and 3) numbers and types of trucks. The Maryland list, shown in Table III-1, is based on 1974 data and also indicates the percentage of gasoline distributed to exempt customers. The Virginia list, shown in Table III-2 is based on data gathered in 1972, although it was published in a February 1975 emissions data report. PES has prepared a similar summary, presented in Table III-3 of information obtained from personal interviews with bulk plant operators in these areas. Combining and comparing these three summaries, several statements about throughput, customers and emissions can be made.

Two histograms, Figures 3 and 4, have been prepared to show the average daily gasoline throughput for the bulk plants in the two AQCRs. Figure 3 is based on data from Maryland and Virginia and Figure 4 is based upon PES survey data. Comparisons among these data and the previously reported data (1) are tabulated below:

| Gasoline Throughput | Percentage of Bulk Plants | | |
|---|---|---|---|
| | Maryland & Virginia | PES | Reference 1 |
| 4,000 gal/day <(15,000 l/day) | 56% | 57% | 51% |
| 10,000 gal/day <(38,000 l/day) | 92% | 89% | 89% |

Since the original of Table III-2 contained company names, a direct comparison of changes in throughput and storage was possible. Ten plants were contacted and all responded. As of 1972 the total throughput at these plants was 15,455,000 gal/year (58,500,000 l/yr) and their gasoline storage was 393,000 gal. (1,500,000 l.) The new data provided PES show their total throughput has decreased by 34% to 10,224,000 gal/year (38,700,000 l/year)although their gasoline storage capacity has increased by 24,000 gallons (91,000 l.) The largest bulk plant operation has decreased its yearly throughput from 5,400,000 gal (20,000,000 l.) to 4,500,000 gal. (17,000,000 l.) Assuming a plant operates five days a week, 52 weeks a year, this particular facility has decreased its average daily throughput from 21,000 gal (79,000 l.)to 17,000 gal. (66,000 l.) One plant which had a 1972 throughput of 1,600,000 gal (6,000,000 l) and a storage capacity of 34,000 gal (129,000 l.) has closed. Comments by former competitors suggested it was too far from the majority of its customers, so its transportation costs were inordinately high. Even excluding this plant, a 25% decrease in gasoline throughput in Virginia is still evident.

In Maryland, the average annual gasoline throughput appears to have increased. In 1974, 37 plants delivered 39,000,000 gal (148,000 l.) through their loading racks; 28 plants in 1975 delivered 32,000,000 gal (120,000,000 l.). Extrapolating the gallonage through 28 plants to the expected throughput for 37 plants suggests an average increase in gasoline volume of 7%.

Gasoline storage capacity at a typical plant in the Baltimore-Washington, D.C. area will consist of a 20,000 gal. (76,000 l.) storage tank for each grade of gasoline--regular, premium and unleaded. Excluding one plant with two above ground tanks each with a 120,000 gal (450,000 l.) capacity, the amount of gasoline stored in below ground tanks is about 5% greater than that stored in above ground tanks. Generally the size range in above ground tanks is 10,000 to 30,000 gal (38,000 to 114,000 l.) capacity. For underground tanks, the capacities vary from 6,000 to 20,000 gal. (23,000 to 76,000 l.). Storage capacity for distillates depends primarily on the marketing emphasis of a particular plant; therefore, it may range from 0 upwards. The largest storage facility could accommodate 1,900,000 gal. (7,000,000 l.) of fuel oils, kerosene and diesel fuel. Overall, the plants surveyed sold about $6 \times 10^6$ gal/year ($22 \times 10^6$ l/year) of distillates. This is one and one-half times their total gasoline sales and two and one-half times the sales of gasoline through the bulk plant.

Pumping rates are between 100 and 300 gal/min (380 and 1,140 l/min) with the majority having 200 gal/min (760 l/min) pumps. The account trucks have capacities of 1,000 to 3,000 gal (3,800 to 11,400 l.) and may have up to five compartments. The typical bulk plant will have two of these trucks for gasoline deliveries. Plants with high volumes of distillates may have as many as six other small trucks, but the operators generally prefer to dedicate a truck for gasoline. This reduces problems with contamination and cleaning and it also reduces the possible number of trucks which might need to be equipped with vapor recovery equipment.

Only 10 of the 28 plants surveyed had installed a vapor balance system on their storage tanks to return vapors to the transports when gasoline was received. (This has often been referred to as Phase I of a vapor recovery program). Only one plant has modified the loading rack and the small delivery trucks to recover vapors generated during the loading or unloading of gasoline of these small trucks. (This would be Phase II of the vapor recovery program). A detailed discussion of this vapor recovery installation appears in Section IV.

Questions asked customers included:

1. the amount of gasoline sold to farm accounts
2. the size of tanks at farm accounts
3. the amount of gasoline sold to customers with tanks of less than 2,000 gal. (7,800 l.) capacity
4. the number of new tanks installed since January 1, 1973
5. what vapor control techniques customers have already installed.

As was stated earlier, Maryland had already asked bulk plants about their annual sales to farm accounts and to customers with tanks smaller than 2,000 gal. (7,800 l.). The data summary obtained has been included as Table III-1. A histogram of the average daily gasoline throughput to different types of accounts has been prepared from this summary and is shown in Figure 5. Figure 6 is the same type histogram prepared from responses made by bulk plants contacted by PES.

Based upon the Maryland data, a daily average of 4,400 gal. (16,700 l.) are delivered to farm accounts and 118,000 gal. (447,000 l.) to small tanks, leaving 73,000 gal. (276,000 l.) to be delivered to other accounts, all of which will be treated here as non-exempt accounts.

Bulk plant operators stated tanks on farms are all small: 275 gal and 550 gal (1,000 l. and 2,100 l.) were the most common sizes mentioned. No one spoke of a farm tank larger than 1,000 gal. (3,800 l.). Therefore, in interpreting the two histograms, the left one third of each graph is incorporated into the middle segment. One of the first correlations attempted was comparing the throughput to non-exempt accounts with the total bulk plant throughput. In Figure 7, the total throughput of each bulk plant in Maryland is plotted against its throughput to non-exempt accounts. The histograms showed a substantial percentage of plants -- 65% in the Maryland study, 74% in the PES survey -- dispensing less than 1,000 gal/day (3,800 l/day) to non-exempt accounts. This graph shows these plants have a wide range in total gasoline throughput -- up to nearly 12,000 gal/day (44,000 l/day). The clustering of points underscores the fact that the traditional marketing emphasis of a large number of bulk plants has been deliberately focused on the use and servicing of small tanks. The larger throughput plants may also make an effort to deliver gasoline to large accounts directly from the terminal.

The 13 plants in Maryland delivering more than 1,000 gal/day (3,800 l/day) to non-exempt accounts are less easily grouped. The average total daily throughput ranges from 3,500 gal to 10,000 gal. (13,000 l. to 39,000 l.) and the average daily throughput to non-exempt accounts ranges from 1,000 to 4,300 gal. (3,800 to 16,000 l.).

The differences between the graphs in Figures 5 and 6 warrant some discussion. There are really three sets of data, obtained for three different years. It is very possible that businesses have changed considerably in only a short time. The decrease in throughput for Virginia bulk plants, discussed earlier, could cause several changes in graphs of gasoline distribution. The PES data do support the speculation put forth earlier that smaller bulk plants selectively service customers with small tanks.

The number of new tanks installed since January 1, 1973 is not known with any degree of certainty. The majority of dealers stated they had not installed any new tanks because of unfavorable market conditions. One of the larger distributors stated he had installed 40 new tanks, all of which were, to the best of his knowledge, in compliance with current Virginia State regulations. It also appears that only about nine or ten large accounts with existing tanks having a capacity of 2,000 gal (7,600 l.) or more have installed submerged fill pipes and vapor return lines on their tanks. Four of these accounts were definitely identified as service stations.

### 2. Operational Changes in Bulk Plants

Within the past year seven bulk plants have been sold by two major oil companies. With one exception, the commission agent bought the plant he had been operating. Two purchase prices disclosed were $65,000 and $45,000. The asking price for a plant which was closed and partially dismantled about two years ago is $60,000, according to a former competitor.

Extrapolating the data obtained by PES to all bulk plants in the Baltimore/Washington, D.C. area, delivery volumes from bulk plants have increased by 7%, while delivery volumes directly from the terminal to the customer, by the bulk plant operator in his own transport trailer, have increased by 123%. Increased sales to non-exempt customers account for both increases. This now means nearly half the gasoline now sold by bulk plants is transported directly from the terminal to the customer and never passes through the bulk plant. The implications of direct haul deliveries have been discussed in Part A of this section. Operators often discussed the possibility of transporting even more gasoline directly to the customers should they be required to spend substantial amounts of money for vapor control equipment or other plant modifications which would reduce the profitability of their operation. As stated earlier, direct delivery of gasoline from the terminal to the customer is less expensive than transferring gasoline into storage tanks at the bulk plant and then reloading it into smaller trucks for customer delivery.

### 3. Expected Operational Changes Related to Vapor Recovery

As stated earlier, only 10 of 28 plants surveyed had installed a vapor balance system on their storage tanks to return vapors to the transports when gasoline was received. Five plants have throughputs low enough to be exempt from current Maryland and Virginia State regulations. However, it is imperative to realize that all these facilities are subject to Federal regulations.

In an attempt to assess the economic impact of the investment in vapor recovery systems by bulk plants, the hypothetical question was asked, based upon financial and cost data presented in Reference 1, "If a vapor recovery system were to cost you $10,000 ($20,00, $30,000) initially and 20% of that for annual maintenance, would you continue to sell gasoline?" Of the 20 who responded, 5 said they would stop selling gasoline either altogether or they would not dispense any through the bulk plant if an initial expense of $10,000 were required; 6 said they would take the same action if $20,000 were needed; 2 said $30,000 was the limit. The remainder are people who just recently bought plants and some very large firms: they intend to do whatever is necessary to succeed in their businesses.

It should be noted that a sufficient market for direct haul sales exists for bulk plant operators to seriously consider eliminating rack sales of gasoline rather than install vapor control equipment. A small volume of customers would most probably have to find another bulk plant willing to deliver to him should his current supplier elect to deal only in direct hauling from the terminal.

## C. BULK PLANTS IN THE HOUSTON/GALVESTON AREA

### 1. Description of Bulk Plants Surveyed

PES has compiled a list of the bulk plants in nine counties within the Houston/Galveston AQCR which are affected by vapor recovery regulations in Appendix A. The locations of these bulk plants are shown in Figure 8.

Since there was no previous bulk plant inventory PES had to locate all the bulk plants in the area of concern. A total of sixty-five to seventy-four bulk plants were operating in the area. The range is given because nine operations could not be found or verified as bulk plants. Table III-4 gives a summary of the data obtained by PES through interviews with thirty-one bulk plant operators. The summary includes data on gasoline throughput, type and capacity of storage tanks, percentage of exempt accounts, type of vapor recovery installed and number of account trucks.

The average gasoline throughput at the bulk plants was 8,350 gal/day (31,600 l/day). A histogram depicting the distribution of gasoline through the bulk plants surveyed is shown in Figure 9. Gasoline throughputs were found to range from 2,300 gal/day (8,600 l/day) to 21,600 gal/day (81,700 l/day). The total annual throughput of gasoline for the bulk plants in the Houston/Galveston area was approximately 152,000,000 gal/year (575,000,000 l/year).

According to the PES survey approximately 80% of the bulk plants had aboveground tanks. The average aboveground storage capacity was approximately 48,000 gal (182,000 l.) stored in three to four storage tanks. Aboveground storage tank sizes ranged from 1,000 gal (3,800 l.) to 42,000 gal (159,000 l.) with most tanks in the range of 14,000 to 17,000 gal (53,000 to 64,000 l.). The average storage capcity for bulk plants with underground tanks was 26,000 gal (98,000 l.) in two to three storage tanks. The size ranges of underground storage tanks observed was 1,000 gal (3,800 l.)

to 18,000 gal (68,000 l.) and the average tank was 10,000 gal (38,000 l.). In only one case did a bulk plant have storage for gasoline above and below ground. One bulk plant operator planned to change all his aboveground tanks to underground tanks. He felt that this would eliminate spillage problems and ease the installation of vapor recovery.

PES found that 75% of the bulk plants in the affected areas had already installed Phase I vapor recovery for incoming loads to the plant. In all cases this consisted of vapor balance systems. In a majority of these plants, the vapor recovery was installed by a major oil company since over 70% of all the bulk plants were associated, either as a consignee or a distributor, with a major oil company. This large percentage of vapor recovery installations was a consequence of the original date for compliance with the applicable regulations of January 1, 1977. The date for compliance has now been delayed to May 31, 1977. This was announced in Federal Register, 41, 56642, December 29, 1976 .

Pumping rates were much lower than those found in the Maryland and Virginia areas. Pumping rates ranged from 40 gal/min to 180 gal/min (150 l/min to 680 l/min) with the majority of plants having pumping rates less than 100 gal/min (380 l/min). The average pumping rate for the plants surveyed was 75 gal/min (285 l/min). The account trucks owned by the plant operators ranged in size from 1,000 to 4,000 gal (3,800 l. to 15,100 l.). The average bulk plant surveyed had two account trucks. It was also found that 68% of the bulk plant operators had installed vapor recovery on at least one account truck. The equipment installed generally consisted of a manifolded vapor return line, a permanent submerged fill pipe and overfill protection.

The average percentage of exempt accounts -- tanks less than 2,000 gal (7,600 l.) and farm accounts -- served by the bulk plants in the Houston/Galveston area was 67%. Since these accounts were smaller than the non-exempt accounts, only about 50% of the gasoline throughput was to the exempt accounts. In some cases the bulk plant was used to service only exempt accounts with the non-exempt accounts being serviced directly from the terminal, bypassing the bulk plant. For example, one bulk plant operator had a throughput of gasoline at his plant of 5,000 gal/day (18,900 l/day) serving only exempt accounts. This operator then delivered an additional 27,300 gal/day (103,300 l/day) directly from the terminal to non-exempt accounts. Most of the non-exempt accounts had installed only recovery for incoming loads, again, because of the required date for compliance with Texas state gasoline vapor control regulations.

Over 90% of the bulk plants in the area incorporated top loading for account trucks on their loading racks. There was one plant that had both top and bottom loading, the top loading for filling account trucks and the bottom loading for filling large tanker trucks. Vapor recovery controls were installed on the loading racks in 36% of the plants. The vapor recovery installation consisted of vapor tight connections similar to those expected in bottom loading vapor recovery installations. A more detailed description of this vapor recovery installation can be found in Section IV.

### 2. Operational Changes in Bulk Plants

Twelve bulk plants in the Houston/Galveston area have already closed or are closing as of January 1, 1977. Two operators stated they were closing specifically as a result of the cost of attempting to comply with the vapor recovery regulations. One other plant relocated operations to a county which was not affected by vapor recovery regulations in order to avoid installing the necessary equipment to control hydrocarbon emissions.

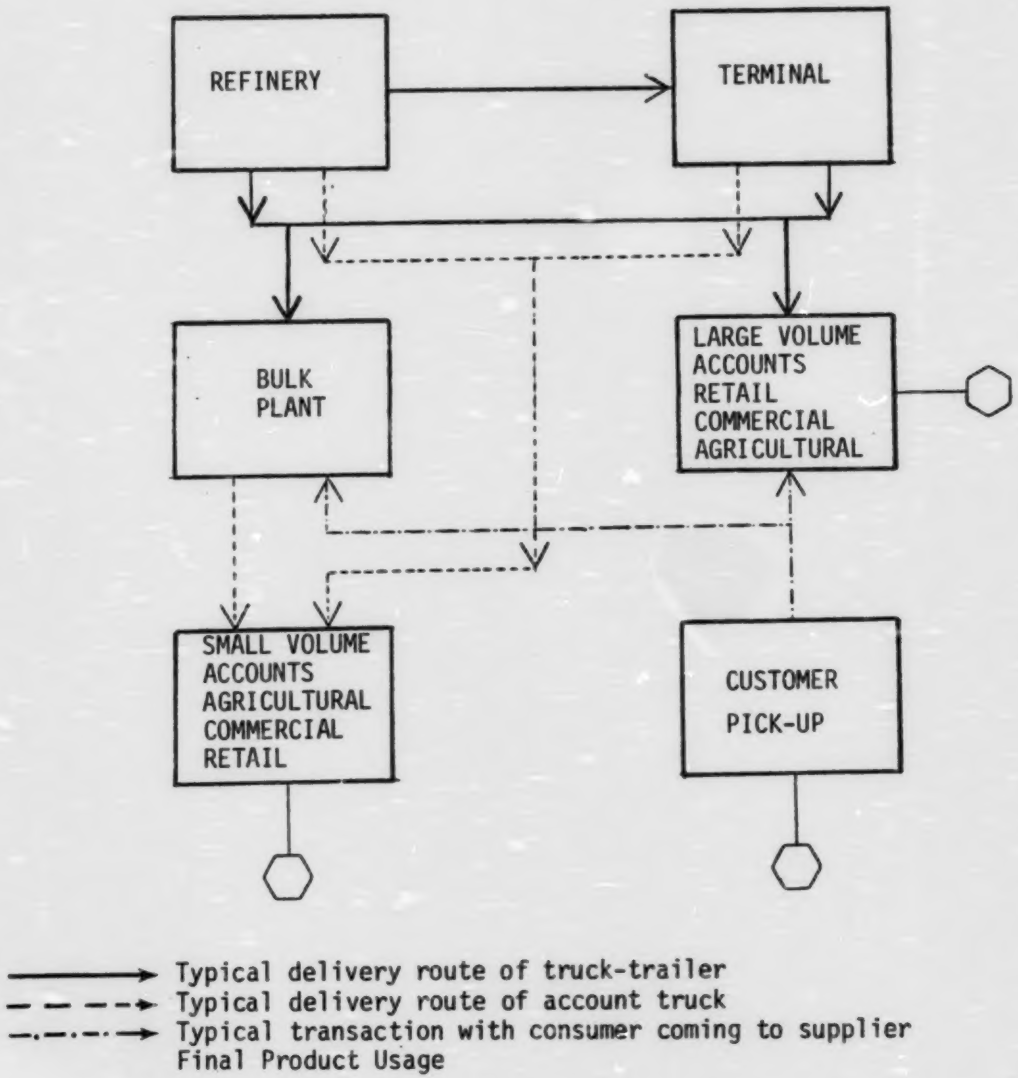
REFINERY
TERMINAL
BULK PLANT
LARGE VOLUME ACCOUNTS RETAIL COMMERCIAL AGRICULTURAL
SMALL VOLUME ACCOUNTS AGRICULTURAL COMMERCIAL RETAIL
CUSTOMER PICK-UP
Typical delivery route of truck-trailer
Typical delivery route of account truck
Typical transaction with consumer coming to supplier
Final Product Usage

Figure 1 APPLICABLE GASOLINE DISTRIBUTION NETWORK

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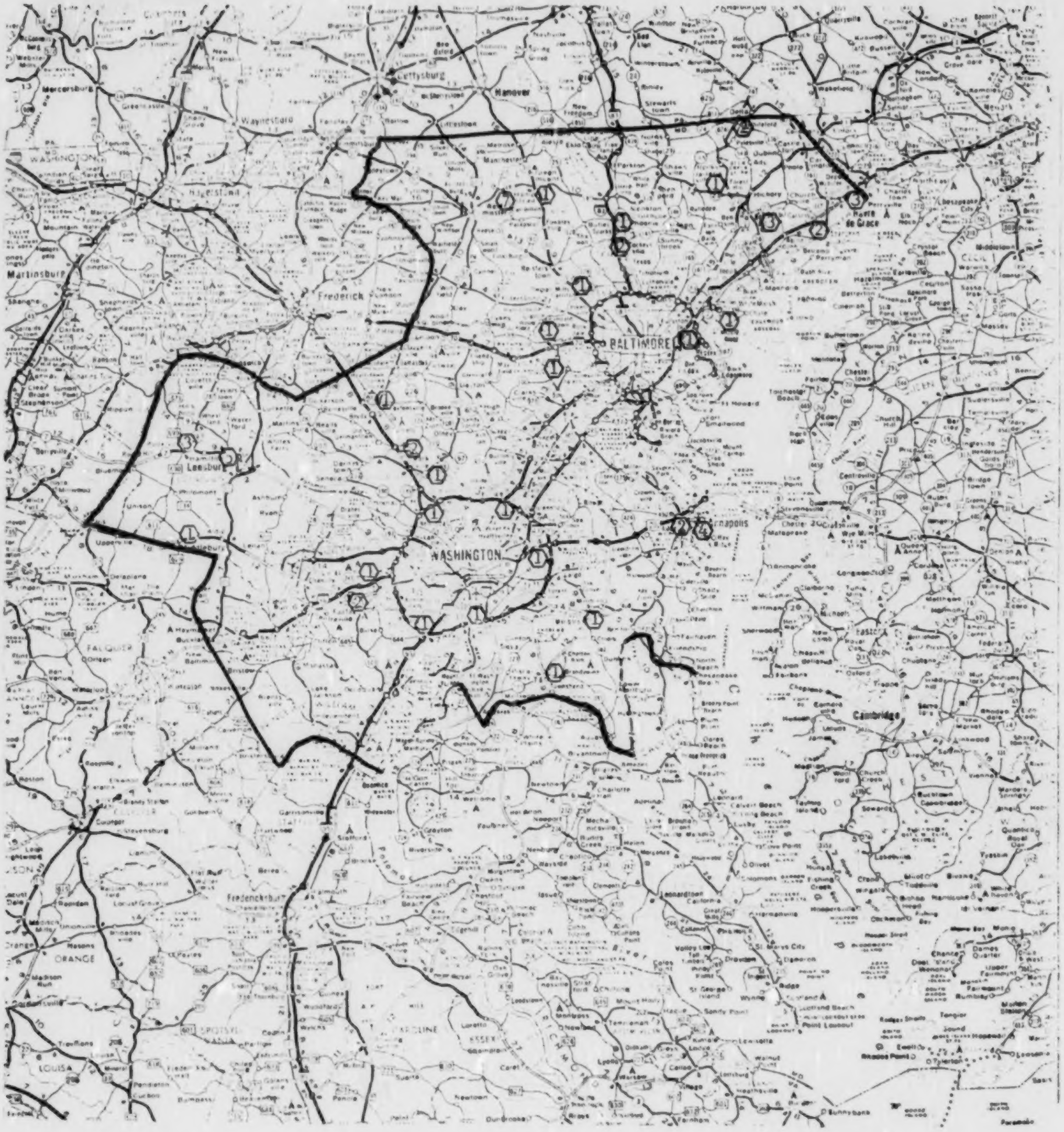
Figure 2. LOCATION AND NUMBER OF GASOLINE BULK PLANTS IN BALTIMORE AND NATIONAL CAPITAL AIR QUALITY CONTROL REGIONS


Gettysburg
Hanover
Waynesboro
Mercersburg
Hagerstown
Martinsburg
Frederick
BALTIMORE
Havre de Grace
Leesburg
Annapolis
WASHINGTON
Cambridge
Fredericksburg
ORANGE
LOUISA
FAUQUIER
CAROLINE
ESSEX

Legend: ⬡ Location of Bulk Plants
5 Number of plants within a town

Table III-1

BULK PLANT GASOLINE - MD AREAS III & IV

| THROUGHPUT - GAL/YR |  | RACK SALES - % |  | BULK STORAGE TANKS |  | DELIVERY TRUCKS |  |  |
|---|---|---|---|---|---|---|---|---|
| PLANT | LOADING RACK | FARM | TANKS UNDER 2000 gal | QUAN. | DESCRIPT. | QUAN | # COMP'T | % PUMP METERED |
| 360,000 | 360,000 | 60 | 99 | 3 | BELOW GRADE | 2 | 1 | 100 |
| 2,297,824 | 1,960,550 | 30 | 100 | 5 | 3 VERT. ABOVE & 2 BELOW GR. | 7 | 1 | 100 |
| 500,000 | 500,000 | 0 | 97 | 5 | BELOW GRADE | 2 | 3 | 100 |
| 900,000 | 900,000 | 33 | 98 | 20 | BELOW GRADE | 1 | 3 | 100 |
| 1,681,946 | 1,681,946 | 5 | 50 | 7 | ABOVE GRADE | 2 | 4 | 100 |
| 1,425,680 | 1,425,680 | 32 | 75 | 3 | ABOVE GRADE | 3 | 3 | 100 |
| 888 205 | 200 356 | 75 | 85 | 3 | 1 ABOVE & 2 BELOW GRADE | 2 | 5 | 98 |
| 3 068 707 | 3 000 000 | 60 | 95 | 3 | 1 ABOVE & 2 BELOW GRADE | 8 | 4 | 100 |
| 470 000 | 470 000 | 90 | 96 | 2 | BELOW GRADE | 2 | 2 | 100 |
| 856 000 | 701 675 | 67 | 100 | 2 | BELOW GRADE | 1 | 4 | 100 |
| 2 050 734 | 1 177 357 | 85 | 95 | 5 | ABOVE GRADE | 3 | 1 | 100 |
| 503 282 | 503 282 | 60 | 100 | 2 | BELOW GRADE | 1 | 3 | 100 |
| 1 500 000 | 1 500 000 | 10 | 25 | 2 | ABOVE GRADE | 1 | 3 | 100 |
| 4 402 895 | 781 954 | 26 | 86 | 3 | ABOVE GRADE | 1 | 3 | 100 |
| 2 561 823 | 2 561 823 | 1 | 68 | 2 | BELOW GRADE | 3 | 4 | 100 |
| 2 300 000 | 1 000 000 | 80 | 100 | 3 | 2 ABOVE & 1 BELOW GR. | 2 | 5 | 100 |
| 1 058 082 | 587 366 | 15 | 90 | 2 | BELOW GRADE | 1 | 2 | 100 |
| 497 186 | 482 270 | 45 | 100 | 2 | BELOW GRADE | 2 | 5 | 100 |
| 2 779 257 | 2 046 943 | 6 | 84 | 2 | FLOATING PAN | 3 | 4 | 54 |
| 6 248 390 | 1 456 434 | 16 | 78 | 3 | BELOW GRADE | 2 | 3 | 100 |
| 549 540 | 549 540 | 2 | 85 | 3 | BELOW GRADE | 1 | 2 | 100 |
| 914 900 | 914 900 | 25 | 70 | 2 | BELOW GRADE | 1 | 2 | 100 |
| 660 000 | 490 000 | 50 | 95 | 3 | BELOW GRADE | 1 | 3 | 100 |
| 700 000 | 100 000 | 2 | 100 | 1 | BELOW GRADE | 1 | 1 | 100 |
| 504 000 | 504 000 | 14 | 88 | 3 | ABOVE GRADE | 1 | 4 | 100 |
| 2 589 462 | 2 588 462 | 24 | 71 | 3 | ABOVE GRADE | 3 | 5 | 100 |
| 1 286 000 | 1 286 000 | 20 | 65 | 8 | 3 ABOVE & 5 BELOW GRADE | 2 | 3 | 100 |
| 1 132 000 | 1 132 000 |  | 5 | 4 | ABOVE GRADE W VAPOR BAL | 2 | 1 | 5 |
| 45 000 | 30 000 |  | 100 | 2 | ABOVE GRADE | 1 | 5 | 100 |
| 1 035 000 | 1 035 000 | 35 | 95 | 2 | 1 ABOVE & 1 BELOW GRADE | 2 | 3 | 100 |
| 360 000 | 360 000 | 5 | 95 | 3 | BELOW GRADE | 2 | 2 | 10 |
| 165 000 | 165 000 | 20 | 80 | 2 | BELOW GRADE | 3 | 3 | 100 |
| 1 649 000 | 1 649 000 | 50 | 100 | 2 | BELOW GRADE | 3 | 5 | 100 |
| 2 000 000 | 1 500 000 | 40 | 75 | 5 | 2 ABOVE & 3 BELOW GRADE | 5 | 3 | 100 |
| 1 679 979 | 1 679 979 | 4 | 81 | 2 | BELOW GRADE W P/V | 2 | 2 | 100 |
| 1 360 000 | 889 217 | 20 | 71 | 5 | 1 BELOW, BALANCE ABOVE GRADE | 5 | 4 | 100 |
| 2 900 000 | 1 000 000 | 40 | 95 | 4 | BELOW GRADE | 2 | 2 | 100 |

Source, Maryland Bureau of Air Quality and Noise Control

## Table III-2
## Virginia AQCR 7
## BULK PETROLEUM PLANTS - CY 1972 (M GALS)

| Company[c, f] | TPB Area | Gasoline Thruput | Gasoline Stor. | Distillate Thruput | Distillate Stor. |
|---|---|---|---|---|---|
| | 866 | 1704 | 34 | 932 | 44 |
| | 866 | 4925 | 25 | 292 | 55 |
| | 866 | 235 | 15 | 744 | 45 |
| | 866 | 1600 | 34 | 744 | 45 |
| | 866 | 1680 | 30 | 105 | 40 |
| | 555 | 2400 | 40 | 2400 | 40 |
| | 865 | 372 | 20 | 417 | 30 |
| | 866 | 1420 | 40 | 212 | 90 |
| | 866 | 1232 | 37 | 27 | 32 |
| | 655 | 3000 | 25 | 6192 | 87 |
| | 866 | 600 | 20 | 400[b] | 30[b] |
| | 866 | 232 | 19[c] | --- | NA[c] |
| | 342 | 5400 | 90[c] | 480 | 108 |
| | 453 | 780 | 30[c] | --- | NA[c] |
| | 656 | 828 | 19[c] | 160 | 35 |

**Notes**

- a - Submerged fill loading racks; others are splash fill.
- b - Estimated.
- c - Underground; others are above ground.
- d - Exempt from control (under 26,000 gallons.)
- e - None of these sources have the potential to emit 100 tons.
- f - Company names deleted to protect confidentiality of information.

Source, Virginia State Air Pollution Control Board

SHEET 7

## Table III-3. BULK PLANTS IN BALTIMORE/WASHINGTON D.C. AREAS INTERVIEWED BY PES

| PLANT THROUGUPUT | | RACK SALES | | GASOLINE STORAGE | | | VAPOR RECOVERY[b] | ACCOUNT TRUCKS[c] |
|---|---|---|---|---|---|---|---|---|
| | | FARMS | SMALL TANKS[a] | TANKS | CAPACITY, THOUSAND | | | |
| Gal/Day | 1/Day | % | % | Number[d] | Gal | 1 | | Number |
| 15,400 | 58,000 | 0 | 70 | 2U | 40 | 151 | + | 2 |
| 700 | 2,600 | 75 | 85 | 2U, 2A | 41 | 155 | - | 3S |
| 700 | 2,600 | 0 | 60 | 6U | 34 | 129 | - | 1S |
| 3,200 | 12,000 | 75 | 100 | 3U | 22 | 83 | - | 1S |
| 4,500 | 17,000 | ? | 97 | 3U | 34 | 129 | + | 1S |
| 10,800 | 41,000 | 25 | 71 | 3A | 61 | 231 | - | 5S |
| 1,600 | 6,000 | 95 | 99 | 2U | 30 | 114 | - | 1S |
| 2,700 | 10,000 | 3 | 20 | 4A | 80 | 303 | +, ! | 2* |
| 4,800 | 18,000 | 75 | 95 | 4A | 80 | 303 | - | 4S |
| 2,000 | 7,500 | ? | ? | 2U | 24 | 91 | - | 1 |
| 6,800 | 26,000 | 15 | 25 | 3A | 51 | 193 | - | 5 |
| 5,800 | 22,000 | 75 | 95 | 2A, 1U | 58 | 219 | + | 1 |
| 3,600 | 14,000 | 75 | 75 | 3A | 45 | 170 | - | 1S |
| 1,900 | 7,300 | 78 | 99 | 1U,3A | 50 | 190 | - | 2S |
| 3,000 | 11,000 | 65 | 100 | 2U | 40 | 151 | + | 1S |
| 1,250 | 4,700 | 10 | 95 | 3U | 26 | 98 | + | 1S |
| 7,700 | 29,000 | 5 | 90 | 2A | 240 | 908 | - | 4S |
| 4,800 | 18,000 | 30 | 30 | 2U | 30 | 114 | + | 3S |
| 17,300 | 66,000 | ? | 75 | 3U | 90 | 341 | + | 1S |
| 900 | 3,300 | 80 | 80 | 1A,1U | 35 | 133 | + | 1S |
| 1,500 | 5,500 | 25 | 45 | 2U,1A | 50 | 189 | - | 1 |
| 1,500 | 5,800 | 85 | 99 | 2A,1U | 34 | 129 | - | 2S |
| 1,900 | 7,300 | 70 | 90 | 2A | 20 | 76 | - | 3S |
| 8,000 | 30,000 | 5 | 50 | 2A | 40 | 151 | - | 1 |
| 5,500 | 21,000 | 50 | 100 | 3U | 90 | 341 | - | 2 |
| 1,000 | 3,900 | 75 | 99 | 5A | 69 | 261 | - | 4S |
| 8,300 | 32,000 | 50 | 99 | 3A | 45 | 170 | + | 2S |

[a] Tanks less than 2,000 gal capacity (7600 1)

[b] Vapor recovery systems for control of incoming loads, + = yes, - = no; for control of outgoing loads, ! = yes

[c] All plants surveyed, except one marked with asterisk, used only top-loading account trucks. S: submerged filling

[d] U = underground tanks; A = aboveground tanks

Figure 3. AVERAGE DAILY GASOLINE THROUGHPUT DATA FROM STATES OF MARYLAND AND VIRGINIA

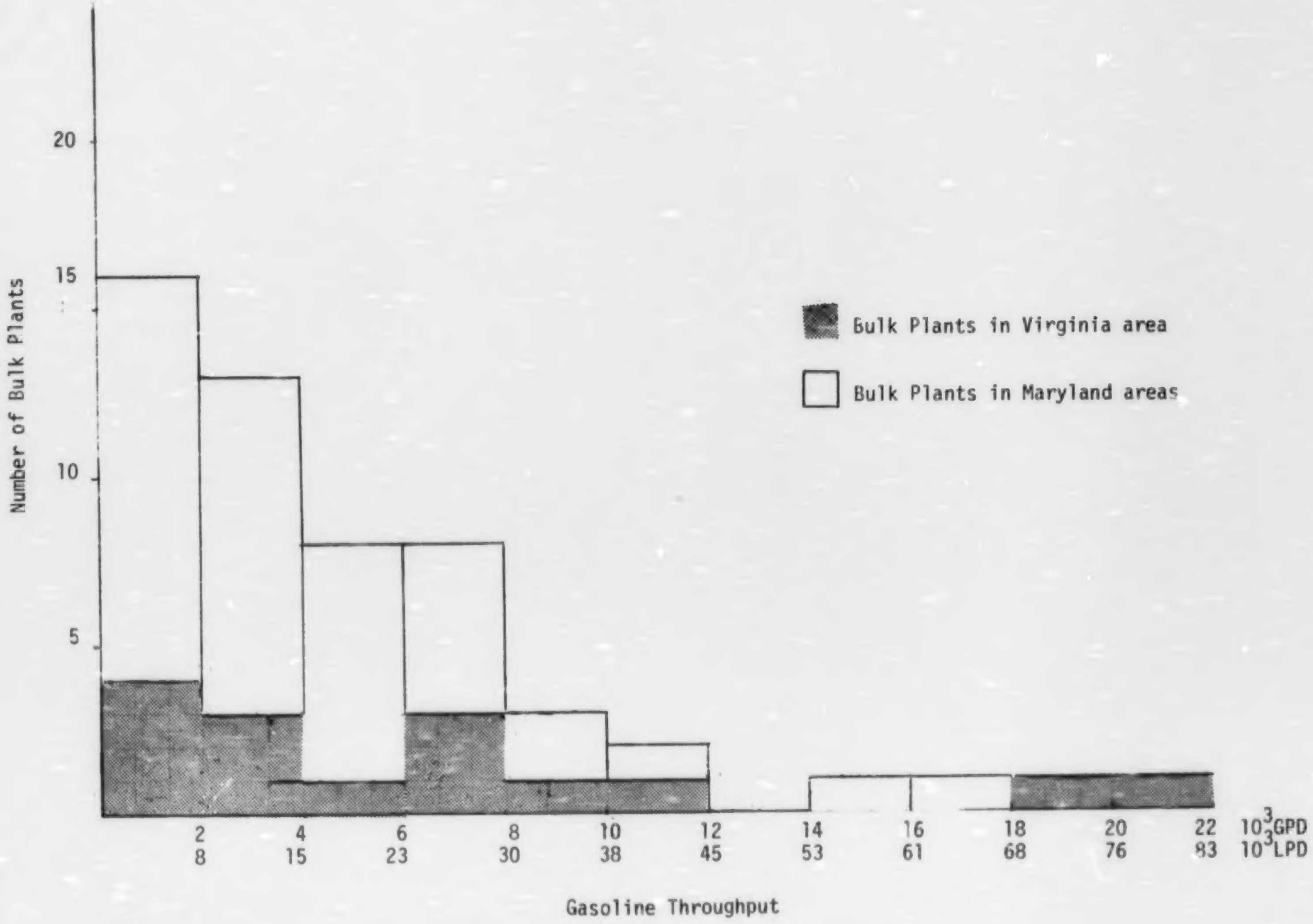


Figure 4. AVERAGE DAILY GASOLINE THROUGHPUT PES SURVEY DATA FOR MARYLAND AND VIRGINIA

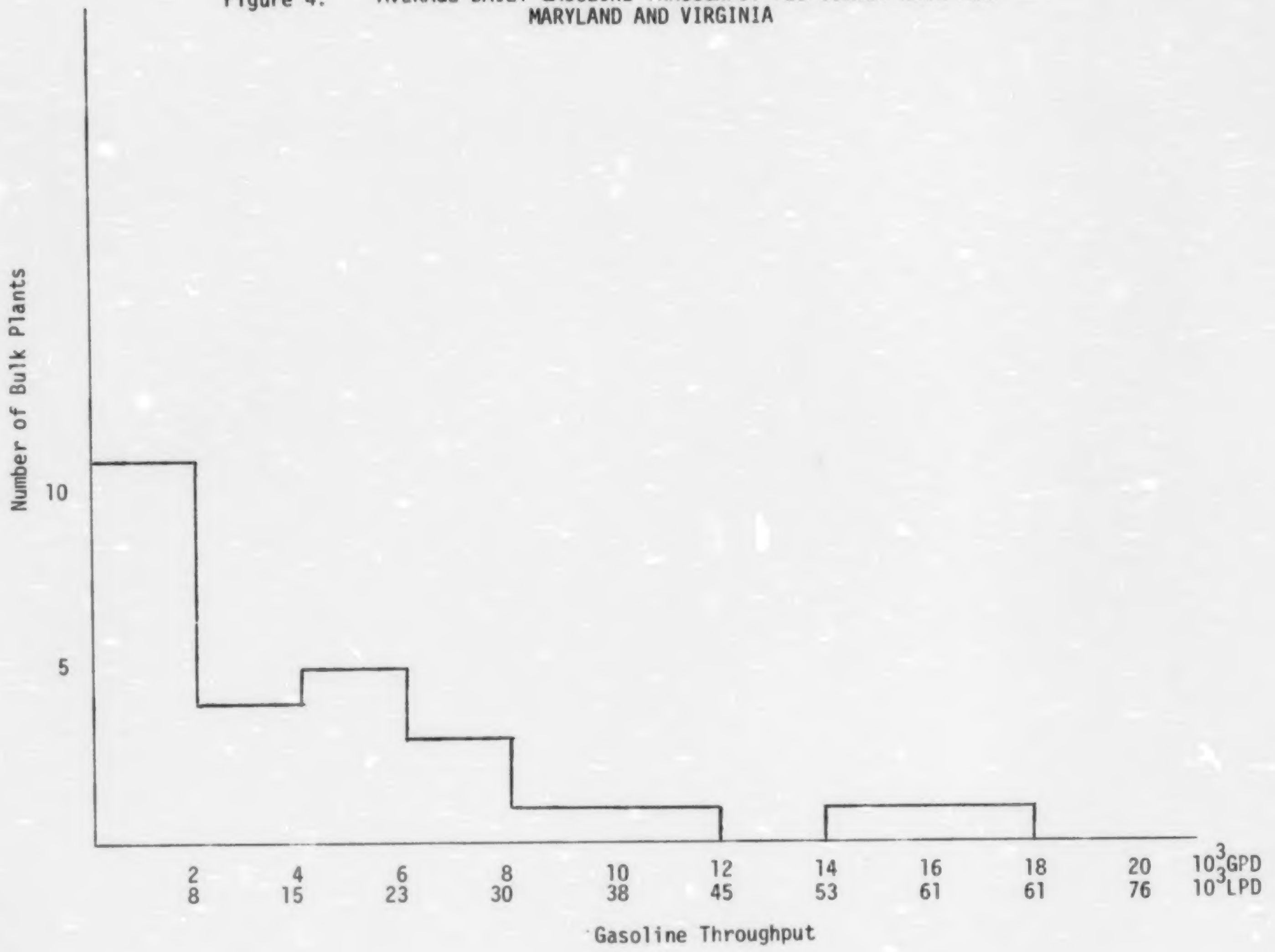


Figure 5. AVERAGE DAILY GASOLINE THROUGHPUT TO DIFFERENT TYPES OF CUSTOMERS (DATA FROM STATE OF MARYLAND SURVEY

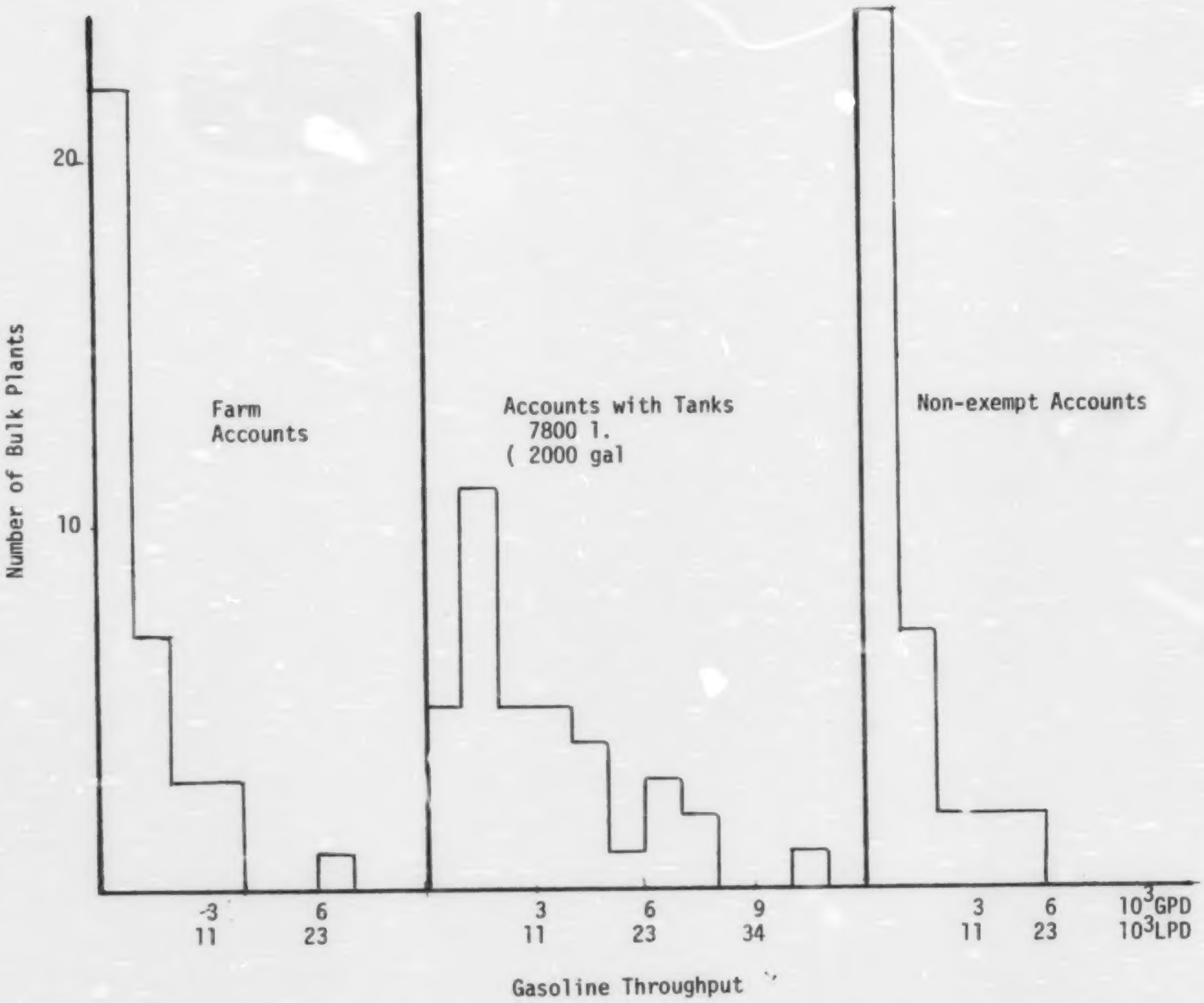


Figure 6. AVERAGE DAILY GASOLINE THROUGHPUT TO DIFFERENT TYPES OF CUSTOMERS (BULK PLANTS INTERVIEWED BY PES)

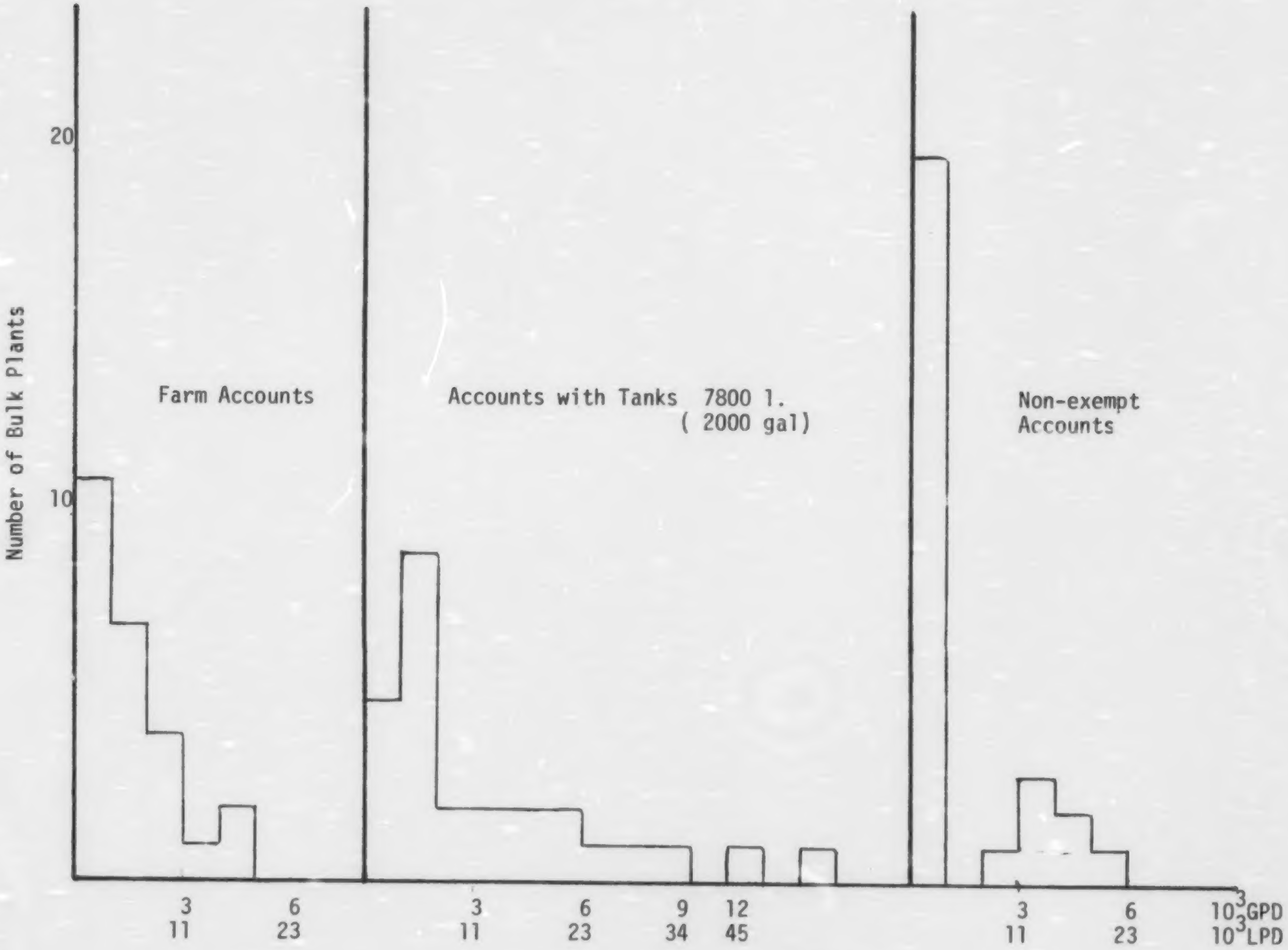


Figure 7. RELATIONSHIP BETWEEN TOTAL RACK THROUGHPUT OF GASOLINE AND VOLUME DISTRIBUTED TO NON-EXEMPT ACCOUNTS (BASED ON DATA FROM STATE OF MARYLAND SURVEY)

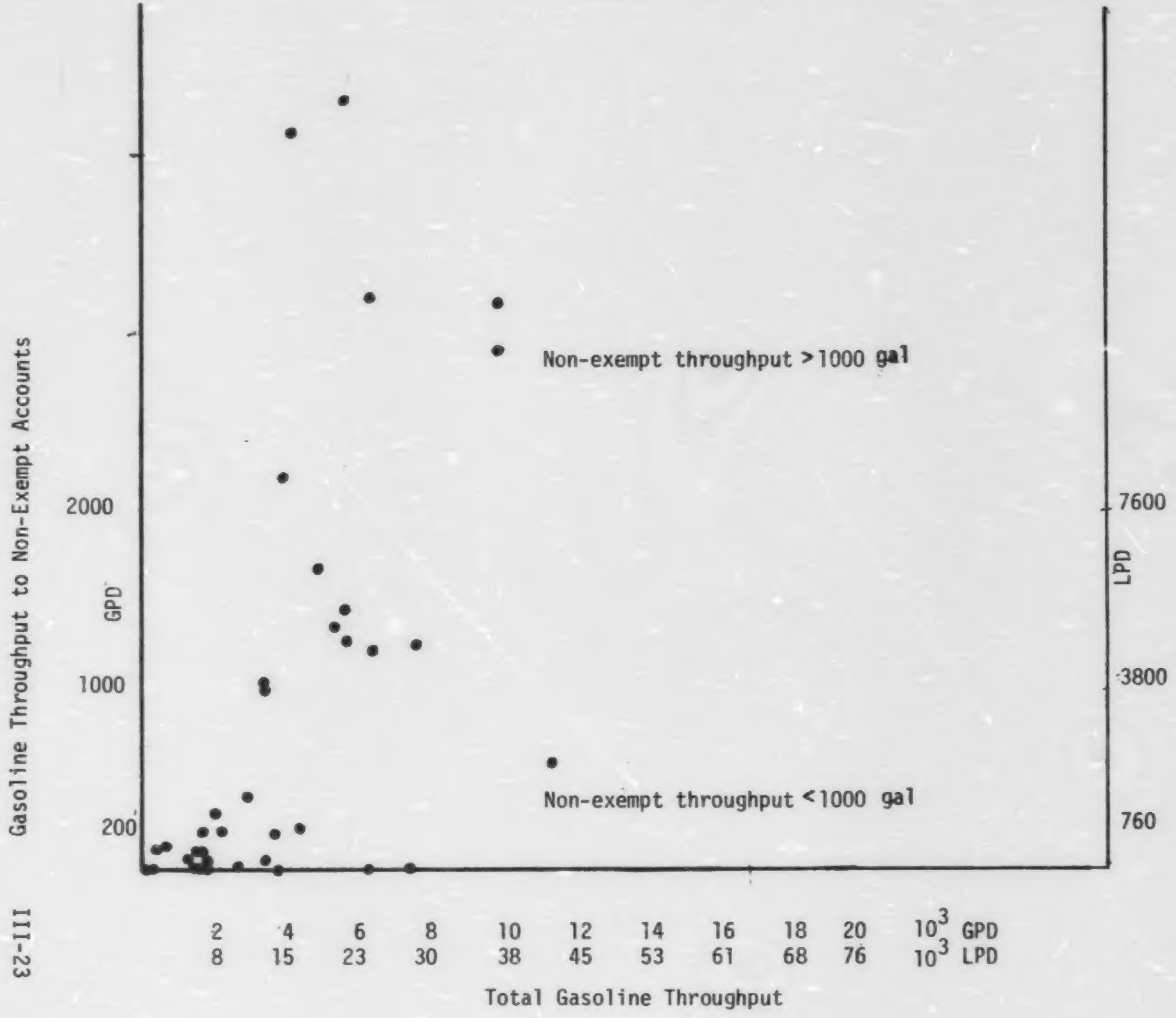
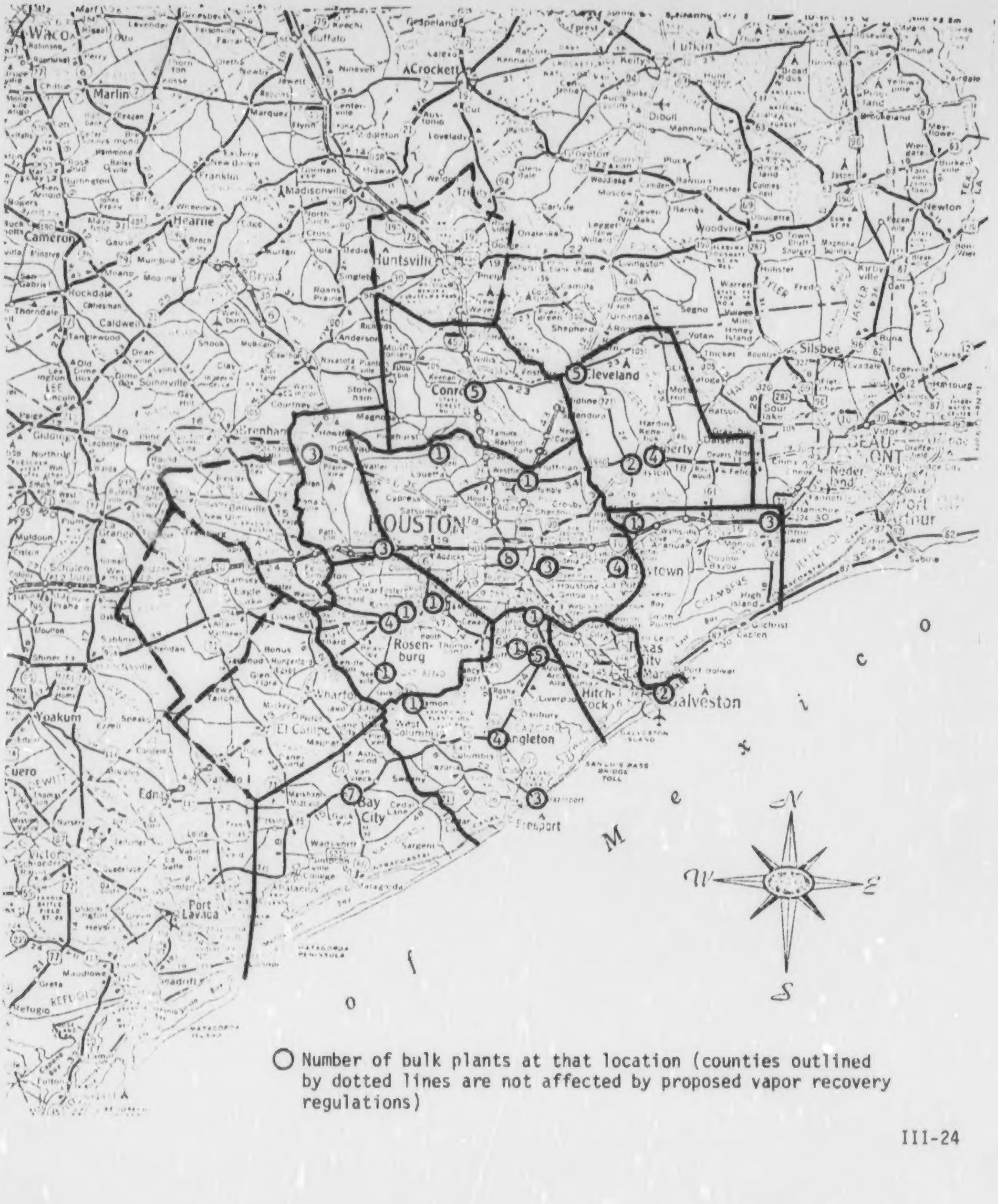


Figure 8. LOCATION OF BULK PLANTS IN THE HOUSTON/GALVESTON AREA


Waco
Marlin
Crockett
Lufkin
Madisonville
Huntsville
Cameron
Hearne
Bryan
Livingston
Woodville
Newton
Silsbee
Conroe
Cleveland
Liberty
Beaumont
Port Arthur
HOUSTON
Brenham
La Grange
Rosenberg
Baytown
Texas City
Galveston
Hitchcock
Wharton
El Campo
Angleton
Freeport
Bay City
Edna
Yoakum
Port Lavaca
Refugio
Gulf of Mexico
N
W
E
S

○ Number of bulk plants at that location (counties outlined by dotted lines are not affected by proposed vapor recovery regulations)

## Table III-4. SUMMARY OF DATA OBTAINED ON BULK PLANTS IN HOUSTON/GALVESTON AREA

| Plant Throughput | | Exempt Accounts | | Storage Tanks | | | Vapor Recovery | Account Trucks |
|---|---|---|---|---|---|---|---|---|
| | | Farm | Non-Farm Tanks | Tanks | Capacity Thousand | | | |
| Gal/Day | L/Day | % | % | No. | Gal | L | | Number |
| 3,200 | 12,100 | 60 | 40 | 3A[a] | 29 | 110 | III[b] | 3 |
| 5,700 | 21,500 | 60 | 40 | 3A | 38 | 143 | I[c] | 2 |
| 18,200 | 68,800 | 10 | 90 | 4A | 50 | 190 | I, II[d], III | 2 S[e] |
| 9,100 | 34,400 | 20 | 10 | 3A | 51 | 193 | I, II, III | 3 S |
| 7,600 | 28,800 | - | - | 4A | - | - | - | 2 |
| 11,400 | 43,000 | 40 | 20 | 3A | 55 | 208 | I, II, III | 2 S |
| 11,400 | 43,000 | 40 | 40 | 4A | 48 | 182 | I, III | 2 |
| 11,400 | 43,000 | 50 | 40 | 5A | 60 | 227 | I, II, III | 3 S |
| 9,100 | 34,400 | 5 | 85 | 4A | 50 | 190 | I, II, III | 2 S |
| 6,400 | 24,100 | 70 | 29 | 3A | 36 | 136 | I, III | 2 |
| 6,800 | 25,800 | 25 | 40 | 3A | 50 | 190 | I, II, III | 3S |
| 4,500 | 17,200 | 50 | 30 | 3U[f] | 24 | 91 | III | 2 |
| 7,400 | 28,000 | 25 | 65 | 3U | 30 | 114 | I, III | 3 |
| 9,100 | 34,400 | 1 | 20 | 3U | 26 | 98 | I, II, III | 2 S |
| 3,200 | 12,100 | 2 | 2 | 2U | 36 | 136 | I | 1 |
| 4,500 | 17,200 | 5 | 0 | 2U | 20 | 76 | None | 2 |
| 2,300 | 8,600 | - | - | 2U | 20 | 76 | - | - |
| 8,300 | 31,500 | 33 | - | 3A | 38 | 143 | None | 2 |
| 11,400 | 43,000 | 10 | 80 | 3A | 42 | 159 | I, III | 2 |
| 3,200 | 12,100 | 50 | 48 | 3A | 52 | 197 | I | 1 |
| 3,400 | 12,900 | 80 | 20 | 2A | 35 | 132 | None | 1 |
| 5,000 | 18,900 | 25 | 75 | 3A | 47 | 178 | I, III | 1 |
| 3,000 | 11,200 | 80 | 20 | 2A | 56 | 212 | None | 1 |

Table III-4 (continued). SUMMARY OF DATA OBTAINED ON BULK PLANTS IN HOUSTON/GALVESTON AREA

| Plant Throughput | | Exempt Accounts | | Storage Tanks | | | Vapor Recovery | Account Trucks |
|---|---|---|---|---|---|---|---|---|
| | | Farm | Non-Farm Tanks | Tanks | Capacity Thousand | | | |
| Gal/Day | L/Day | % | % | No. | Gal | L | | Number |
| 7,700 | 29,200 | 5 | 15 | 4A | 63 | 238 | I, III | 2 |
| 19,000 | 71,900 | - | - | - | - | - | I, II, III | - |
| 12,500 | 47,300 | 5 | 30 | 5A | 70 | 265 | I, II, III | 3 S |
| 2,300 | 8,600 | 33 | 67 | 3U, 6A | 17 | 64 | None | 1 |
| 21,600 | 81,700 | 15 | 25 | 4A | 53 | 201 | I, III | 3 |
| 4,500 | 17,200 | 40 | 0 | 4A | 52 | 197 | I, II | 2 |
| 7,300 | 27,500 | 40 | 0 | 3A | 36 | 136 | I, III | 2 |
| 18,200 | 68,800 | - | - | 4A | 56 | 212 | - | - |

[a] A = Aboveground tank

[b] III = Vapor Recovery installed on at least one account truck

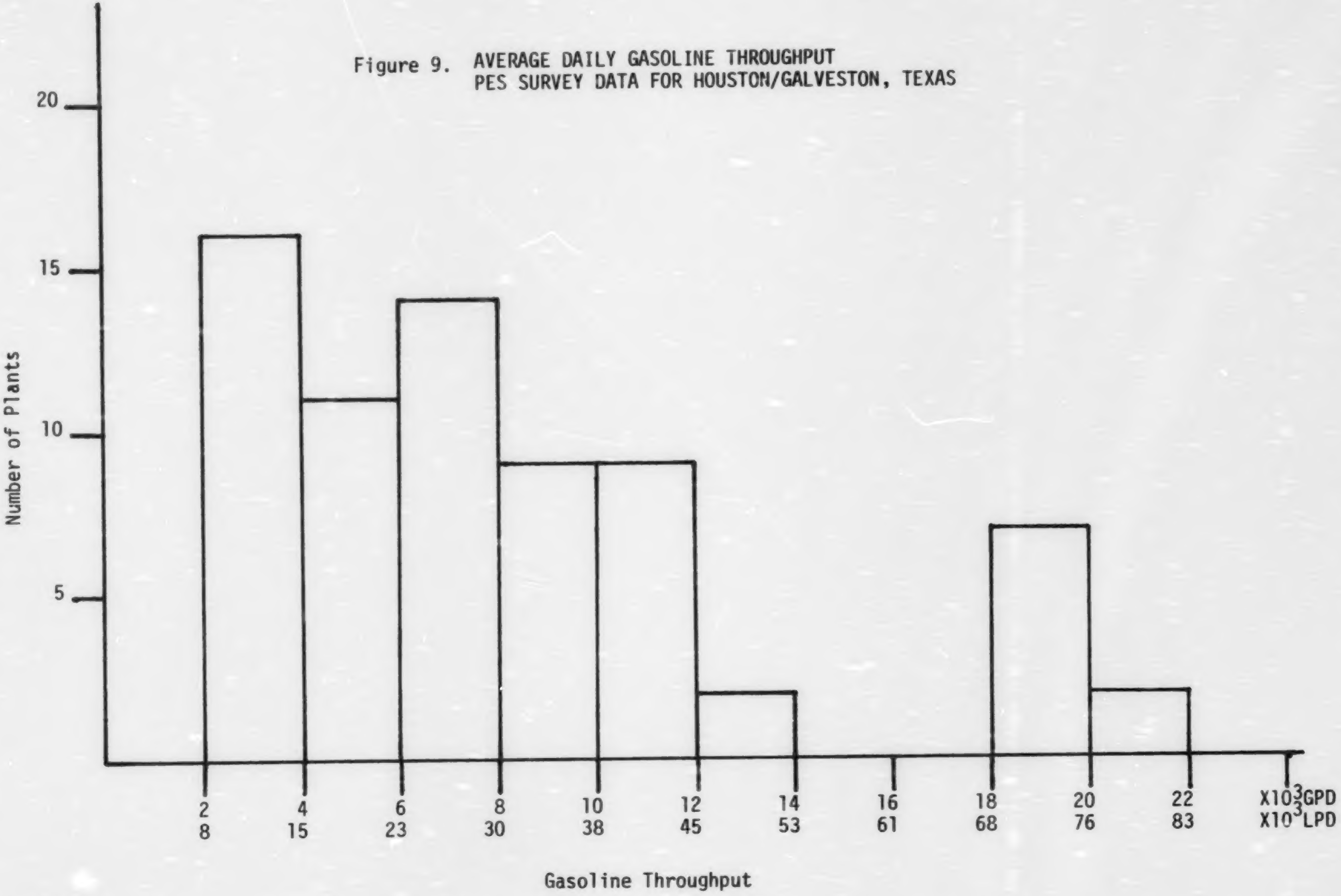
[c] I = Phase I Vapor control

[d] II = Phase II Vapor control

[e] S = Submerged fill

[f] U = Underground tank

Figure 9. AVERAGE DAILY GASOLINE THROUGHPUT
PES SURVEY DATA FOR HOUSTON/GALVESTON, TEXAS



# IV. HYDROCARBON EMISSIONS CONTROL AT BULK PLANTS

## A. HYDROCARBON EMISSIONS CONTROL REGULATIONS

### 1. Maryland and Virginia Regulations

Copies of the sections of the State Implementation Plan and state regulations which apply to bulk plant operations in the Baltimore and Washington, D.C. areas are given in Appendix B.

Included in the Baltimore Intrastate AQCR are the counties of Harford, Baltimore, Carroll, Howard, and Anne Arundel. The National Capital Interstate AQCR includes Prince Georges and Montgomery counties in Maryland and Alexandria, Fairfax, Loudoun and Prince William counties in Virginia.

Federally approved State Implementation Plans for Maryland and Virginia require gasoline transfer vapor control in the Baltimore and National Capital AQCRs. In essence all facilities transferring gasoline from a delivery vessel into a stationary storage container with a capacity greater than 250 gal (950 l.) are to prevent release to the atmosphere of no less than 90% by weight of organics in the displaced vapors. Then the vapor-laden delivery vessel may be refilled only at facilities with an equally effective vapor recovery system. The regulations do not apply to 1) stationary containers having a capacity less than 550 gal (2,100 l.) used exclusively for fueling implements of husbandry, 2) any container having a capacity less than 2,000 gal (7,600 l.) installed prior to the promulgation of the regulation, 3) transfers made to floating roof storage tanks (or equivalent). Nor do they apply to any stationary container at any facility in the affected areas of Maryland where the monthly average throughput exceeds 20,000 gal (76,000 l.) and is subject to Maryland regulations [illegible]3.38.04J(2)(e) (1) and (2) and 10.03.39.04J(2)(e)(1) and (2[illegible]e date for final compliance in both Maryland and in Virginia is May 31, 1977.

The aforementioned sections of Maryland State Regulations require bulk plants having a monthly throughput of 20,000 to 50,000 gal (76,000 to 189,000 l.) to install a vapor balance or similar system to recover vapors from loading into existing stationary tanks of capacity less than 40,000 gal (150,000 l.) by May 31, 1977. However, these sections do not discuss the vapor laden delivery vessel.

The commonwealth of Virginia "Regulations for the Control and Abatement of Air Pollution" Section 4.52(e) also differs from the Virginia SIP. A critical difference is in the phrase no gasoline shall be transferred from any delivery vessel into any stationary storage container with a capacity greater than 2,000 gal (7,600 l.) unless it is equipped with a submerged fill pipe and a prescribed vapor recovery system. Specific exemptions are granted to facilities whose average monthly gasoline throughput is less than 20,000 gal (76,000 l.) and all stationary storage containers used predominantly for refueling mobile farm equipment, as well as transfers to floating roof tanks (or equivalent).

## 2. Texas Regulations

The Texas SIP regulations are applicable to the following counties in the Houston/Galveston area: Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Matogorda, Montogomery and Waller. These regulations require that by May 31, 1977 no gasoline shall be transferred from a delivery vessel into any stationary container with a capacity greater than 1,000 gal (3,800 l.) unless it is equipped with a submerged fill pipe and the vapors displaced from the storage tank during filling operations are processed by a system that prevents the release of no less than 90 percent by weight of the total hydrocarbon compounds. The vapor laden delivery vessel can be refilled only at facilities having equally effective vapor recovery systems. Exemptions to the Texas SIP regulations include those for storage tanks used for the storage of gasoline on a farm or for farming purposes, for storage tanks having a capacity less than 2,000 gal (7,600 l.) installed prior to November 3, 1973, and for storage tanks with floating roofs or equivalent.

The State of Texas Regulation V, which deals with hydrocarbons, radically differs from the Texas SIP regulations in that it is applicable only to Brazoria, Galveston, Harris, Matagorda and Montgomery counties in the Houston/Galveston area. Regulation V also incorporates an exemption for bulk plants that have a throughput of less than 20,000 gal (76,000 l.) per day. This would permit approximately 97% of the plants in the area to not install vapor recovery equipment. Copies of the Texas SIP and State of Texas regulations can be found in Appendix C.

These several differences between Federally approved SIP Regulations and separate State Regulations must be resolved before a successful vapor control strategy can be implemented.

## B. SOURCES OF EMISSIONS ASSOCIATED WITH HANDLING OF GASOLINE

Vapor can escape from storage tanks, even when there is no transfer activity, because of changes in temperature of the tank wall and stored materials which vary the pressure in the vapor space. Variation forces vapor-laden air out of the tank and aspirates fresh air into the vapor space, allowing further vaporization of gasoline into that space. The amounts of vapor escaping under these conditions are referred to as "breathing losses." Losses of vapors due to liquid transfer are referred to as "working losses" or "transfer losses." The liquid transfer forces air-hydrocarbon vapors out during filling of the tank and ingests air (promoting evaporation) during draining. Miscellaneous or fugitive losses are primarily related to spillage and leakage during gasoline handling.

### 1. Breathing Losses

Factors affecting breathing or standing losses for fixed roof tanks include the amount and volatility of the gasoline stored, type and condition of tanks and appendages, and the prevailing meteorological conditions. If there are no leaks or direct openings, temperature fluctuation is the major cause of breathing losses. As the temperature of the liquid rises, the vapor pressure increases and evaporation takes place. The overall pressure in the gas space increases and when the vent pressure set point is exceeded, a mixture of air and hydrocarbons is discharged into the air. As the temperature decreases, gases partially condense, contract, and fresh air is drawn into the vapor space. This permits additional hydrocarbons to vaporize. Since hydrocarbons are emitted, but generally not drawn back into the tanks, a continued loss of hydrocarbon results from the daily changes in ambient temperature.

### 2. Working Losses

The principal cause of vapor loss during liquid transfer is displacement of the gas (air laden with hydrocarbon vapors) in the vapor space by the liquid entering the tank. Other causes include the entrainment of liquid droplets in the displaced gas and post-withdrawal pressure increase caused by evaporation.

Certain operating conditions can increase or decrease these vapor losses. Splash loading in which gasoline is dumped onto the surface of the liquid causes turbulence which increases evaporation rates and entrainment of droplets in the vapor being displaced. A short interval between emptying and filling of storage tanks can decrease losses by minimizing the time allowed for evaporation. Also, storage tanks can be emptied in increments over a period of several days or can be emptied in one operation prior to refilling, with resultant differences in vapor loss.

Assuming no controls, each time a gasoline tank is filled, the vapors above the liquid surface are emitted to the atmosphere. The quantity of hydrocarbon vapors emitted is a function of the volume displaced, type of loading, temperature and the degree of saturation of the vapor space with gasoline vapors. At any given temperature, the amount of vapor in the vapor space cannot exceed a limit imposed by the saturation pressure corresponding to that temperature. This limit, however, increases as the temperature increases.

In a quiescent state, the approach to saturation and pressure increase of a vapor space with gasoline vapors is a slow process. Since hydrocarbon vapors are heavier than air and diffusion is slow, a saturated blanket of vapor initially forms over the liquid surface, decreasing the driving force for further vaporization. Also, with evaporation of the lighter hydrocarbon molecules, the tendency of the components in the stagnant surface to vaporize decreases. Thus, the degree of saturation in the overall gas space of a tank can be decreased by minimizing liquid surface and vapor space mixing during the filling operation.

Splash loading not only creates liquid droplets which can be entrained in the outgoing effluent and exposes fresh liquid surfaces, but results in mixing of the vapor space as well. This mixing of the vapors disturbs the saturated blanket near the liquid surface, increasing the driving force for further vaporization. Hydrocarbon emissions under splash filling conditions can significantly exceed that calculated by assuming saturation (6).

Another factor which can affect the quantity of hydrocarbons emitted is the interval between drainage and filling. When a tank is drained and immediately refilled, the air drawn into the tank during draining may be expelled with relatively little hydrocarbon content. In a tank allowed to sit after draining, the air drawn into the vapor space becomes saturated with hydrocarbons, thus, increasing pressure (and emissions) and resulting in the maximum loss of vapor during refilling.

Another operational procedure which may increase losses is the small sequential withdrawals of gasoline from a storage tank over a period of several days rather than one continuous large withdrawal. After a small withdrawal, the post-transfer emissions caused by evaporation tend to be high in hydrocarbons since little air is ingested during the withdrawal. After a large withdrawal, the initial post transfer emissions are low in hydrocarbons since large amounts of air are ingested during the withdrawal.

### 3. Miscellaneous Losses

Miscellaneous losses have been found to be highly variable. These losses include spillage, liquid and vapor leakage and operational losses which occur when opening tank hatches for visual inspection or measuring liquid levels with dip sticks. Leakage can occur and has been observed at dry breaks, pressure vacuum valves, hatches, manholes, pump seals, shut-off valves and piping joints. It has been visually observed that some spillage (on the order of half liter) occurs when connecting and disconnecting transfer lines. Visible liquid leakage at dry breaks (few milliliters of gasoline) was observed from the connections after transfer. Opening of hatches generally does not occur during transfer, although several operators report they will open the hatches of an empty truck to verify that they have received all the gasoline expected.

## C. EMISSION CONTROL TECHNOLOGY

### 1. Breathing Losses

Storage tanks are subject to evaporation or standing losses due to volatility of the material stored, type and condition of the tank and its appendages and prevailing meteorological conditions. The simplest methods for reducing these venting losses are to (1) inspect and repair leaks in the tank and fittings, (2) paint the tank with white paint where possible, (3) assure that vent valves do not leak and (4) set the pressure and vacuum relief settings to minimize breathing. The broader the band for the vent valve settings, the lower will be the breathing losses.

Another method for preventing vapor loss is to install vapor recovery equipment at the vent valve. For vapor recovery, the vented vapor must be able to be condensed and recycled to the tank or be collected and regenerated. For prevention of pollution only, the vapors can be combusted or collected and disposed of in some approved manner.

Regulations do not generally require specific control of breathing losses. No further consideration will therefore be given to these control methods.

### 2. Working Losses

Excluding spillage, the two major sources of loss of gasoline vapor during transfer are 1) venting to the atmosphere the volume of gases--air and hydrocarbons--displaced by the entering liquid and 2) filling in a manner which creates turbulence which results in increased vaporization rates and liquid droplet entrainment in the vapor space.

The most common current methods of reducing working losses are to use submerged filling for the loading of gasoline and to install a vapor balance system between the vapor spaces of the tanks connected during the gasoline transfer.

### a. Submerged Fill

Submerged fill is the introduction of liquid gasoline into the tank being filled with the transfer line outlet being below the liquid surface. This is compared to splash loading, where the transfer line outlet is at the top of the tank. Submerged filling minimizes droplet entrainment, added vaporization and turbulence. If a fill port is located at the tank top, submerged fill is accomplished by either extending the nozzle (commonly referred to as stingers) or permanently attaching to the fill port a pipe extending to within 6 inches (15 cm) of the tank bottom. This permanent installation is commonly referred to as a drop tube.

Aboveground storage tanks normally include submerged fill. Submerged fill for underground storage tanks can be accomplished by attaching a pipe to the fill port. These installations are common on underground tanks in surveyed areas.

Bottom loaded trucks by definition include submerged filling. Top loaded trucks utilize an extension such as a pipe or flexible hose facility loading arm. The extension may be permanently attached if the loading arm can be raised sufficiently to clear the trucks. No development is necessary except for customer tanks. The major problem encountered, spitback from customer tanks, can be overcome by inserting a long tube-like nozzle (a stinger) through the filling pipe.

Submerged filling can reduce working losses to a significant degree and is easily adapted to an underground storage tank, or top-loading truck. As mentioned earlier, submerged fill is an integral feature with bottom-loading trucks and aboveground tanks. The system has no significant effect on breathing losses. Cost of conversion is extremely low and applicability to bulk plant operations is good. In top-loading facilities a nozzle extension is the only addition necessary to provide for subsurface loading of the account trucks. For underground storage tanks, a pipe is normally affixed inside so that the discharge occurs near the bottom.

Submerged filling of customer tanks can be accomplished with either nozzle extension or a permanently attached drop tube. Some difficulties have occurred with the installation and use of permanent drop tubes. One problem is "spit back." "Spit back" is the return flow and spillage of gasoline at the fill port during transfer. This appears to be primarily related to the smaller fill port and drop tube sizes in customer tanks, compared to service station tanks, and the lack of a coupling at the fill port interface. Use of a nozzle extension with or without a permanently installed drop tube or a coupling should solve the "spit back" problem.

Another difficulty with the use of submerged filling with customer tanks is the variety of fill ports. Fill ports vary in diameter, type and accessibility. The problem can be likened to the variety of vehicle fuel tank interfaces. The total costs to adapt to this number and variety of customer tank interfaces may be significant. In addition, operators indicate submerged fill hardware is not available for some configurations.

One question which arises is the actual usage of submerged fill when the system is installed. For instance, if a top loading rack or "drop tube" cannot be permanently attached, due to inadequate truck clearance, the driver has a little incentive to attach the drop tube prior to each filling of the account truck. Similarily a driver may not bother using a variety of detachable "stingers" during the customer tank filling.

### b. Balance System

Probably the most common vapor recovery system currently in use is the vapor balance system. Efficiency is good for the control of working losses, but not significant in controlling breathing losses. A pipeline between the vapor spaces of the truck and storage tanks essentially creates a closed system permitting the vapor spaces of the tank being filled and the tank being emptied to balance with each other. The net effect of the system is to transfer vapor displaced by liquid into the tank in which draining of the liquid creates additional vapor space. This prevents the compression and expansion of vapor spaces which would otherwise occur in a filling operation. If a system is leak tight, very little or no air is drawn into the system and venting due to compression also is reduced substantially. The system is applicable to underground and aboveground storage facilities equipped with either bottom or top loading.

Typical facility modifications involved adding aboveground piping from the incoming truck unloading area to a manifold interconnected with all gasoline storage tanks. The vapor return piping is generally 2 to 3 inches (5 to 8 cm) in nominal diameter and it is sloped on horizontal runs to drain any condensate. The no-lead tank may have special protection against contamination from leaded gasoline vapors. Non-metallic piping may be used if local codes allow.

The vapor return line entry into the storage tank may require (1) attachment of a metal plate which can be drilled and tapped or welded onto, (2) drilling and tapping or welding onto an existing appendage, (3) using an existing port, or (4) teeing off an existing vent line piping. The older the tank, the less likely an existing port or vent line will be available for use. Older riveted tank material may not be easily weldable.

The most common problem noted was leakage. Old tank hatches, valves, seals, manholes and sealing surfaces may require significant repair or replacement to affect a seal. In addition, even if only a replacement component is required, the lack of spare parts for discontinued models may require special orders further increasing costs. If costs to an individual bulk plant owner begin approaching the high end of the range of costs for this modification ($10,000), the owner may investigate replacement and possible relocation of storage tanks underground.

Installation of a balance system to the loading rack to return vapors from the account truck to the storage tank has been complicated in many instances by including a conversion of the loading rack from top loading to bottom loading. There is no requirement in the Federal vapor recovery regulations to include this particular modification.

Top loading vapor recovery installations observed in the Houston/Galveston area warrant special attention because of their simplicity, apparent effectiveness and corresponding low cost. Because these installations require minimal conversion of the top loading rack, the total cost for the Phase I and Phase II vapor recovery installation and the conversion of one account truck for submerged fill and vapor recovery would cost approximately $10,000. This amount is considerably less than costs quoted for bottom loading systems.

The Phase I vapor recovery system consisted of installing vapor return piping to each storage tank handling gasoline and a vapor return dry break coupler to prevent vapors escaping from the system when the return line was not connected.

The Phase II vapor recovery piping to the loading rack branches off the Phase I vapor return line and runs to the loading rack. The piping to the loading rack is usually placed underground to minimize problems with truck traffic. At the loading rack, a flexible hose is attached to the vapor return line and then a dry break or vapor tight fitting is affixed to the hose. Again, this is to eliminate vapor losses to the atmosphere when the return line is not connected.

The top loading rack is then modified to enable the vapor tight delivery of gasoline to the account truck. The existing fittings on the loading arm are removed and a vapor tight connector, similar to the OPW Kamlock(R) fitting is attached. If the loading arm is unable to move in both horizontal and vertical planes for exact alignment with the compatible coupler on the account truck a flexible hose is used for this purpose. One end of the hose is attached to the loading arm and the coupler is attached to the other end, thereby providing a flexible connection similar to that on the vapor return hose.

The conversion of the account truck is the last segment of the vapor recovery system installation. The modifications required are performed on each compartment of the account truck. The vapor return line installation involves welding a pipe into each compartment and then joining all pipes together in a manifold (See Figure 10). This manifold line leads to a compatible fitting for the flexible vapor return line at the loading rack. A hole is drilled into each compartment and a submerged fill pipe is permanently attached. To the top of this submerged fill pipe is attached the compatible vapor tight connector for the top loading arm. A cap is

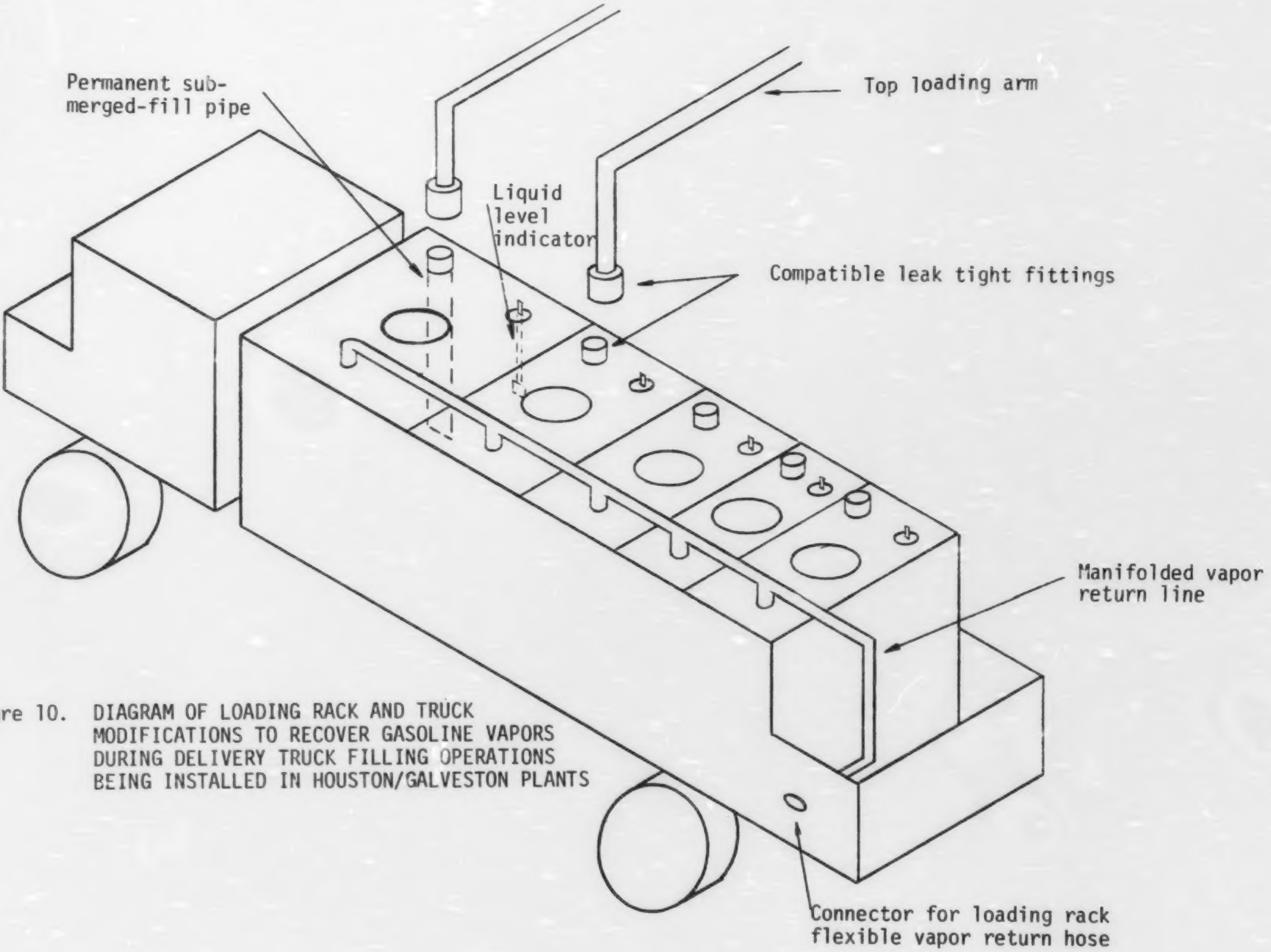

Permanent sub-
merged-fill pipe
Liquid
level
indicator
Top loading arm
Compatible leak tight fittings
Manifolded vapor
return line
Connector for loading rack
flexible vapor return hose

Figure 10. DIAGRAM OF LOADING RACK AND TRUCK MODIFICATIONS TO RECOVER GASOLINE VAPORS DURING DELIVERY TRUCK FILLING OPERATIONS BEING INSTALLED IN HOUSTON/GALVESTON PLANTS

fixed over this connector when it is not in use to eliminate the leakage of vapors to the entrance of dirt or other impurities. The last item to be installed in a compartment is the overfill protection. At the plants visited a graduated rod with a float at the base designed to rise with the level of the gasoline was being used. Graduations of the rod could then be calibrated to indicate the amount of gasoline in the compartment. This type of overfill protection was critized by many of the bulk plant operators interviewed. They stated that the rod would often stick and give inaccurate results. Many of them therefore had little confidence in this type overfill protection system. Other than this complaint, the bulk plant operators interviewed did not state any operational problems.

If a conversion of the loading rack from top loading and bottom loading is included in the total modification, it should be emphasized that the work is being done to modernize the facility and speed up and simplify loading procedures, not because it is necessary in order to provide a sufficiently effective vapor recovery system. In Maryland and Virginia, only one plant has become involved with this phase of vapor recovery. This particular facility elected to convert to bottom loading mainly because they considered the installation costs to be competitive and the system to be simpler and safer to operate. The conversion, performed in 1974, required complete dismantling of the loading rack and installation of meters, valves, hoses, couplers, and accessory equipment for three product lines.

## D. EMISSIONS ESTIMATES

### 1. Baltimore and Washington, D.C, Areas

Both Maryland and Virginia have prepared estimates of hydrocarbon emissions in the AQCRs of concern (3, 4, 5). Because the years upon which these emissions inventories were based differ, and the calculation techniques also differed, current gasoline distribution throughout the two AQCRs will only be an estimate. Comparisons will be based on extrapolating 1971 and 1972 data to 1975 using the total gasoline consumption in Maryland for 1971 and 1975: in 1971 1.3 x $10^9$ gallons of gasoline were consumed in the eight Maryland counties of interest; in 1975 1.5 x $10^9$ gallons were consumed.* The difference between these two numbers will be used as the overall growth rate, that is, 4.4% per year.

The table below summarizes the initial data provided on gasoline distribution.

| Data Source / Gasoline Throughput 1000 gal. (1000 l.) | Maryland 1971 | D.C. 1971 | Virginia 1972 |
|---|---|---|---|
| Terminal | 1,860,000<br>(7,040,000) | 102,000<br>(386,000) | 1,220,000<br>(4,620,000) |
| Bulk Plants | Included with terminals | 0<br>(0) | 24,800<br>(93,900) |
| Service Stations | 1,390,000<br>(5,260,000) | 237,000<br>(897,000) | 449,000<br>(1,700,000) |

Applying an annual growth rate of 4.4% to all these figures indiscriminately will introduce some error: for example, it has been stated earlier that bulk plant throughputs in Virginia have declined substantially. Still, the comparison is useful. Table IV-1 therefore summarizes the PES estimate of how gasoline is distributed throughout these two AQCRs.

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*In metric units, these volumes are 4.9 x $10^9$ liters and 5.7 x $10^9$ liters, respectively

Table IV-1. GASOLINE DISTRIBUTION IN BALTIMORE AND WASHINGTON, D.C. AREAS: 1975 ESTIMATE

| Area<br>Gasoline Throughput 1,000 Gal (1,000 l.) | Baltimore AQCR | Montgomery & Prince George's Counties | District of Columbia | Virginia | National Capital AQCR |
|---|---|---|---|---|---|
| Terminals | 2,170,000<br>(8,210,000) | 0<br>(0) | 122,000<br>(462,000) | 1,390,000<br>(5,260,000) | 1,512,000<br>(5,724,000) |
| Bulk Plants | 32,100<br>(122,000) | 8,800<br>(33,300) | 0<br>(0) | 28,200<br>(107,000) | 28,200<br>(107,000) |
| Service Stations | 960,000<br>(3,630,000) | 690,000<br>(2,610,000) | 282,000<br>(1,067,000) | 510,000<br>(1,930,000) | 792,000<br>(3,000,000) |

Emissions from gasoline storage and handling were reported by counties for 1971 (4). They are summarized here for each AQCR.

| | |
|---|---|
| Baltimore AQCR | 15,300 tons/year<br>(13,900 metric tons/year) |
| National Capitol AQCR | 15,000 tons/year<br>(13,600 metric tons/year) |

The Maryland 1975 Emissions Inventory (5) indicates hydrocarbons emitted from gasoline storage and handling have decreased in the Baltimore area to 11,200 ton/year (10,200 metric tons/year) and in Montgomery and Prince George's counties from 5,200 tons/year (4,700 metric tons/year) to 4,100 tons/year (3,700 metric tons/year.) Using the changes in Baltimore area counties as typical of the entire Washington, D.C. area the emissions there for 1975 are estimated at 11,000 ton/year (10,000 metric tons/year).

The Virginia emissions report (3) estimated the specific contribution of bulk plants to hydrocarbon emissions from gasoline storage and handling. In 1972, bulk plants were calculated to contribute 207 tons/year (188 metric tons/year). The Council of Governments in Washington, D.C. prepared their own inventory for 1973 in which the Virginia bulk plants were considered responsible for 69% of the emissions from all bulk plants in the AQCR. Thus, in 1972, bulk plants in the National Capitol AQCR emitted 299 tons of hydrocarbons (271 metric tons).

Because the PES survey of Virginia plants found their throughput had decreased since 1972, their emissions will also have decreased. For the purpose of comparing 1972 Virginia data with 1974 Maryland data, PES is going to assume that 1974 Virginia bulk plant throughputs remained at the levels tabulated for 1972.

As a result of recent revisions to emission factors for gasoline marketing operations in "Compilation of Air Pollutant Emission Factors" and a proportioning of these factors for use with bulk plant operations (2), the 1972 emissions recalculated. Then estimates of current emissions and future emissions, assuming various control strategies, can be made and compared with past situations.

The following emissions factors were applied:

| | | |
|---|---|---|
| Fixed roof storage tanks; | breathing loss | 6.7 lbs/day/tank |
| | working loss | 9.7 lbs/day/1000 gal. |
| Floating roof storage tanks; | breathing loss | .078 lbs/day/1000 gal. storage |
| | working loss | .023 lb/1000 gal. throughput |
| Truck loading loss; | splash fill | 14.0 lb/1000 gal throughput |
| | submerged fill | 5.8 lb/1000 gal throughput |
| | balance system (90% efficiency) | .96 lb/1000 gal throughput |
| Miscellaneous | | 3.2 lb/1000 gal throughput |

The Commonwealth of Virginia used the following data to calculate hydrocarbon emissions for 1972:

| | |
|---|---|
| Gasoline storage | 320,000 gallons (1,210,000 liters) |
| Number of aboveground fixed roof storage tanks (PES estimate) | 22 |
| Working losses based on | 18,168,000 gal/yr (68,770,000 l/yr) |
| Splash loaded gasoline | 13,113,000 gal/yr (49,640,000 l/yr) |
| Submerged fill loaded gasoline | 12,295,000 gal/yr (46,540,000 l/yr) |

Emissions from bulk plants in the Virginia portion of the National Capital AQCR for 1972 are classified as follows:

| | | |
|---|---|---|
| Gasoline storage | 26.9 tons | (24.4 metric tons) |
| Distillate storage | 2.9 | (2.6) |
| Gasoline Handling | 215.6 | (195.5) |
| Distillate Handling | 8.1 | (7.3) |
| Miscellaneous | 41.0 | (37.2) |
| | 294.5 tons | (267.0 metric tons) |

Emissions from bulk plants in the several Maryland counties of interest were calculated using the following data obtained for 1974:

| | |
|---|---|
| Number of aboveground fixed roof tanks | 49 |
| Gasoline storage in floating roof tanks | 240,000 gal.<br>(908,000 l.) |
| Working losses based on | 39,190,000 gal/yr.<br>(148,300,000 l/yr) |
| Throughput at plants with Phase I vapor recovery | 1,100,000 gal/yr.<br>(4,290,000 l/yr) |
| Splash loaded gasoline (PES estimate) | 18,390,000 gal/yr<br>(69,610,000 l/yr) |
| Submerged fill loaded gasoline (PES estimate) | 20,800,000 gal/yr<br>(78,740,000 l/yr) |

Emissions from bulk plants in Maryland for 1974 are classified as follows:

| | | |
|---|---|---|
| Gasoline storage | 63.3 tons | 57.4 metric tons |
| Gasoline handling | 374.3 | 339.5 |
| Miscellaneous | 62.7 | 56.9 |
| Distillate storage<br>Distillate handling | 15 est. | 14 est. |
| | 515 tons | 468 metric tons |

In order to estimate what portion of these bulk plant emissions occur around Baltimore, PES intends to assume that the number of plants near Baltimore is directly related to their contribution of hydrocarbons. Thus 34/43 of the 515 tons/year or 407 tons/year (369 metric tons/year) are emitted by bulk plants in the Baltimore AQCR. Likewise, 9/43 of the 515 tons/year plus 295 tons/year from Virginia bulk plants or 403 tons/year (366 metric tons/year) are emitted by bulk plants in the National Capital AQCR.

The results of this plant survey also provide sufficient data to estimate current emissions. The one assumption which must be used is that the sample is a representative proportion of the whole. Data needed for calculating emissions are summarized below:

| | Affected Counties in Virginia | Affected Counties in Maryland |
|---|---|---|
| Number of Operating Bulk Plants | 13 | 43 |
| Number Surveyed | 8 | 20 |
| Number of aboveground fixed roof storage tanks at visited plants | 15 | 27 |
| Gasoline storage in floating roof tanks | 0 | 240,000 gal<br>(908,000 l.) |
| Working losses based on throughput | 11,380,000 gal/yr<br>(43,100,000 l/yr) | 21,600,000 gal/yr<br>(81,800,000 l/yr) |
| Throughput at plants with Phase I vapor recovery | 8,140,000 gal/yr<br>(30,800,000 l/yr) | 8,460,000 gal/yr<br>(32,000,000 l/yr) |
| Splash loaded gasoline | 8,000 gal/day<br>(30,000 l/day) | 37,500 gal/day<br>(142,000 l/day |
| Submerged fill loaded gasoline | 35,800 gal/day<br>(136,000 l/day) | 45,700 gal/day<br>(173,000 l/day) |

Emissions from these 28 bulk plants surveyed can be categorized as follows:

| | Virginia | Maryland |
|---|---|---|
| Gasoline storage | 18.3 tons/yr | 33.0 tons/yr |
| Gasoline handling | 70.0 | 170.5 |
| Miscellaneous | 18.2 | 34.6 |
| | 106.5 tons/yr | 238.1 tons/year |

Applying a ratio of the number of operating plants to the number of plants surveyed, present emissions can be estimated as follows:

| | Virginia | Maryland |
|---|---|---|
| Gasoline storage | 29.7 tons/yr | 72.9 tons/yr |
| Gasoline handling | 113.8 | 376.9 |
| Miscellaneous | 29.7 | 76.5 |
| Distillate storage and Handling (Est.) | 11 | 15 |
| | 184 tons/yr | 541 tons/yr |

Proportioning the Maryland emissions between the Baltimore and Washington, D.C. areas directly in accordance with the number of plants -- 34 near Baltimore, 9 near Washington, D.C. -- current bulk plant emissions are estimated to be:

| | |
|---|---|
| Baltimore AQCR | 428 tons/year (388 metric tons/yr) |
| National Capital AQCR | 297 tons/year (270 metric tons/yr) |

The decrease in throughputs in Virginia bulk plants from the time of the Virginia state survey to the time of the PES survey is responsible for the difference between the two emission estimates

These emission estimates do not include area wide emissions produced by filling of the customer's tanks. This survey found 74% of gasoline being delivered to tanks of less than 7,600 1. (2,000 gal) capacity. Presently these tanks do not have to have any vapor control device, even a submerged fill pipe. The table below shows the current estimated emissions from filling customer tanks assuming small tanks have uncontrolled splash filling and the larger tanks have submerged filling capability.

| | Affected Maryland Counties | Affected Virginia Counties |
|---|---|---|
| Annual throughput using splash fill | 27,220,000 gal<br>(103,000,000 1.) | 20,900,000 gal<br>79,110,000 1.) |
| Annual throughput using submerged fill | 9,560,000 gal<br>(36,190,000 1.) | 7,340,000 gal<br>(27,780,000 1.) |
| Emissions from splash filling | 191 tons/year<br>(174 metric tons/yr) | 146 tons/year<br>(132 metric tons/yr) |
| Emissions from submerged filling | 28 tons/yr<br>(25 metric tons/yr) | 21 tons/yr<br>(19 metric tons/yr) |
| Total emissions in area from customer delivery | 219 tons/year<br>(199 metric tons/yr) | 167 tons/year<br>(151 metric tons/yr) |

At this time there is not sufficient data to estimate the breathing losses of customer tanks. Also, there is no current requirements to attempt to control this emission source.

The estimates of 428 tons hydrocarbons year from bulk plants and 276 tons/year from filling consumers' tanks in the Baltimore area and 297 tons hydrocarbon/year from bulk plants and 110 tons/year from filling consumers' tanks in the Washington, D.C. area will be used in further estimates of how much reduction in emissions is possible with various control strategies.

Current Maryland and Virginia state regulations* exempt bulk plants having an average monthly throughput of less than 20,000 gal (76,000 1.) from all vapor control requirements. A total of four plants with a combined monthly throughput of 63,000 gal (2,400,000 1.) would be involved. Thus, if these regulations were enforced emissions would decrease to the following amounts:

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*See appendix B

| AQCR / Emissions | Baltimore Tons/yr (kkg/yr) | National Capital Tons/yr (kkg/yr) |
|---|---|---|
| Gasoline storage | 57.6 (52.2) | 45.0 (40.8) |
| Gasoline handling | 38.0 (34.5) | 29.1 (26.4) |
| Miscellaneous | 60.5 (54.9) | 45.7 (41.4) |
| Distillate handling and storage (estimate) | 14 (13) | 12 (11) |
| Total | 170 (154) | 132 (120) |

As a result of using vapor balance systems to recover 90% of the hydrocarbons emitted miscellaneous losses would also decrease, but at this point no means of preparing a reasonable estimate appears to be available. Thus, by allowing the states to retain present requirements, emissions would be reduced in the Baltimore AQCR by at least 258 tons/year (234 metric tons/year) and in the National Capital AQCR, by at least 165 tons/year (150 metric tons/year).

Enforcement of the Federally approved SIP regulations would result in the four previously mentioned plants also having to install vapor recovery systems on their facilities. Emissions from gasoline handling would be reduced by 2.5 tons/yr (2.3 kkg/yr) in the Baltimore area and by 1.8 tons/year (1.6 kkg/yr) in the Washington D.C. area.

As more plants install the appropriate vapor recovery control systems, the reduction in hydrocarbon emissions will, of course, be more noticeable. Table IV-2 provides a comparison of how the various size bulk plants affect hydrocarbon emissions in the two AQCRs. In calculating these estimates plants with vapor recovery already installed have been assumed to keep the system operating at a 90% efficiency level and all exempt plants have at least submerged filling of their trucks.

Table IV-2. HYDROCARBON EMISSIONS FROM BULK PLANTS RELATED TO NUMBER OF BULK PLANTS WITH VAPOR CONTROL

| Type of plant complying with vapor recovery regulations (facility throughput) | Area wide tons/year (metric tons/year) | |
|---|---|---|
| | Baltimore | National Capital |
| All | 168(152) | 130(118) |
| ≥20,000 gal/mo (76,000 l/mo) | 170(154) | 132(120) |
| ≥20,000 gal/day (7,600 l/day) | 192 (174) | 154 (140) |
| ≥4,000 gal/day (15,000 l/day) | 213 (193) | 159 (144) |
| ≥6,000 gal/day (23,000 l/day) | 244 (221) | 167 (151) |
| ≥8,000 gal/day (30,000 l/day) | 287 (260) | 209 (190) |
| ≥10,000 gal/day (38,000 l/day) | 287 (260) | 209 (190) |
| ≥1,000 gal/day (3,800 l/day) to non-exempt customers | 267 (242) | 169 (153) |
| ≥2,000 gal/day (7,600 l/day) to non-exempt customers | 267 (242) | 169 (153) |

If all customers with tanks of less than 2,000 tal (7,800 l.) capacity were required to install submerged fill tube and all customers with larger tanks, to install vapor balance systems, the area wide hydrocarbon emissions resulting from customer deliveries would decrease to 84 tons/year (76 metric tons/year) in the Baltimore AQCR and to 65 tons/year (59 metric tons/year) in the National Capital AQCR.

In summary, if the current Federally approved SIP control strategy, which is also the strictest, is stringently applied, the emissions generated by bulk plant operations would be as shown below:

| AQCR / Emission Source | Baltimore tons/year (metric tons/yr) | National Capital tons/year (metric tons/yr.) |
|---|---|---|
| Operations at bulk plants physical location | 168 (152) | 130 (118) |
| Deliveries to customers over entire area | 84 (76) | 65 (59) |
| Total hydrocarbon emissions | 252 (228) | 195 (177) |

### 2. Houston/Galveston, Texas Area

Emission estimates for the bulk plants in the Houston/Galveston area have been calculated for uncontrolled sources, for emissions from bulk plants with current vapor recovery controls, and emissions from bulk plants with potential control under the existing Texas SIP regulations. For estimating uncontrolled emissions, it was assumed that no vapor recovery equipment was installed and that all tank fillings and transfers to account trucks were by splash filling. This would amount to the worst case emissions. For the purposes of these calculations, the average annual throughput of gasoline through each bulk plant was 2,203,000 gal (8,338,000 l.), based upon the PES bulk plant sample. Also for the purposes of these calculations, seventy bulk plants were assumed to be operating in the area. This number was arrived at by including five of the nine unvarified plants and deleting four operations which PES believes are not operating bulk plants.

The uncontrolled emissions from the bulk plants in the Houston/Galveston area are:

Breathing losses from aboveground tanks -
236 tons/year (214 metric tons/year)

Working losses from all bulk plant storage tanks -
737 tons/year (668 metric tons/year)

Transfer losses from filling account trucks -
1063 tons/year (964 metric tons/year)

Transfer losses from filling account's storage tanks -
1063 tons/year (964 metric tons/year)

Miscellaneous losses -
243 tons/year (220 metric tons/year)

Total uncontrolled hydrocarbon emissions -
3342 tons/year (3031 metric tons/year)

The emission factors used for these emission estimates are the same as those listed in the previous section on Baltimore and National Capital regions.

The total projected hydrocarbon emissions for the Houston/Galveston area (11) for 1977, base year 1971, are 314,853 tons/year (285,572 metric tons/year). The projected hydrocarbon emissions from gasoline marketing sources are 20,803 tons/year (18,868 metric tons/year). This indicates that 6.6% of the total hydrocarbon emissions originate from gasoline marketing sources and based upon PES estimates, 16.1% of the gasoline marketing emissions originate from bulk plants.

The total amount of gasoline consumed in the nine affected counties amounted to approximately 2.8 billion gallons (10.6 billion liters) in 1976. This information was derived from fuel tax records and information on vehicle population in the nine counties (12). The total amount of gasoline which passed through the bulk plants was approximately 154 million gallons (583 million liters) or about 5.5% of the total gasoline consumed.

To determine current emissions from bulk plants, data on Phase I and Phase II controls installed were obtained from the PES bulk plant survey. From this data, it was found that 75% of all the bulk plants had installed Phase I vapor recovery. Phase II controls were installed at 36% of all the bulk plants. Vapor recovery had been installed on at least one truck at 68% of the facilities. For calculation purposes, it was assumed, since most bulk plants had one truck with vapor recovery and one without, that the deliveries which went to exempt accounts, i.e., farm accounts and tanks less than 2,000 gal (7,600 l.), were made with the delivery truck which had no vapor recovery. From the PES survey, the average bulk plant delivered 50% of its gasoline -- 67% of its accounts -- to exempt accounts. An efficiency of 90% for the Phase I and Phase II controls was used.

The hydrocarbon emission estimates for the bulk plants in the Houston/Galveston area incorporating current vapor recovery control installations are:

Breathing losses from aboveground tanks -
236 tons/year (214 metric tons/year)

Working losses from all bulk plant storage tanks -
239 tons/year (217 metric tons/year)

Transfer losses from filling account trucks -
791 tons/year (718 metric tons/year)

Transfer losses from filling account's storage tanks -
638 tons/year (579 metric tons/year)

Miscellaneous losses -
243 tons/year (220 metric tons/year)

Total hydrocarbon emissions incorporating current control practices -
2148 tons/year (1948 metric tons/year)

Under current control practices, a 67.5% reduction in working losses, a 25.6% reduction in transfer losses involving account trucks and a 40% reduction in transfer losses involving account tanks served have been accomplished. This is an overall hydrocarbon emission reduction of 35.7% representing 1,194 tons/year (1,083 metric tons/year) from all bulk plant emission sources.

To determine the amount of potential reduction of the hydrocarbon emissions, the vapor recovery and emission controls as outlined in the Texas SIP regulations were extrapolated for the gasoline throughput used above. This would mean that Phase I controls would be installed on all bulk plants, Phase II controls on the racks would be used on all non-exempt deliveries and submerged fill pipes would be installed on all non-exempt tanks. The SIP regulations, as written, do not require any controls to limit storage tank breating losses and miscellaneous losses (i.e., spillage) so these emissions levels do not vary.

The hydrocarbon emission estimates for the bulk plants in the Houston/Galveston area incorporating potential vapor recovery controls are:

Breathing losses from aboveground tanks -
236 tons/year (214 metric tons/year)

Working losses from all bulk plant storage tanks -
74 tons/year (67 metric tons/year)

Transfer losses from filling account trucks -
585 tons/year (530 metric tons/year)

Transfer losses from filling account's storage tanks -
585 tons/year (530 metric tons/year)

Miscellaneous losses -
243 tons/year (220 metric tons/year)

Total hydrocarbon emissions incorporating potential emission controls under Texas SIP regulations -
1723 tons/year (1562 metric tons/year)

Under potential control strategies presented in the Texas SIP regulations, a 90% reduction in hydrocarbon working losses from bulk plant storage tanks and a 45% reduction of transfer losses to both account trucks and account tankage could be experienced. This would yield an overall bulk plant emissions reduction of 48.5% or 1620 tons/year (1469 metric tons/year). If it is assumed that all deliveries made from the bulk plant would require Phase II controls, not just non-exempt deliveries, a further reduction in bulk plant emissions would occur. The overall bulk plant hydrocarbon emissions would then be reduced to 1244 tons/year (1128 metric tons/year). This would then indicate an overall emissions reduction of 63% or 2098 tons/year (1903 metric tons/year).

The effects of various selected increments of compliance with vapor recovery regulations on the hydrocarbon emissions from bulk plants in the Houston/Galveston area are summarized in Table IV-3. The current Texas SIP regulations have exemptions relating to deliveries to farm accounts and tanks of less than 2,000 gal. capacity (7,600 l.)

## Table IV-3. SUMMARY OF DECREASE IN EMISSIONS FROM BULK PLANTS IN HOUSTON/GALVESTON AREA AS FACILITIES COMPLY WITH HYDROCARBON VAPOR RECOVERY REGULATIONS

| Facility Description | Number of Plants Affected | EMISSION ESTIMATE | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | TOTAL | | Breathing Losses From Above Ground Tanks | | Working Losses from All Storage Tanks | | Transfer Losses To | | | | Miscellaneous Losses | |
| | | | | | | | | Account Trucks | | Account Tanks | | | |
| | | T/Yr[b] | MT/Yr[c] | T/Yr | MT/Yr | T/Yr | MT/Yr | T/Yr | MT/yr | T/Yr | MT/yr | T/Yr | MT/Yr |
| Vapor recovery on all bulk plant operations and account tanks | 70 | 765 | 693 | 236 | 214 | 74 | 67 | 106 | 96 | 106 | 96 | 243 | 220 |
| | | 1723 | 1563 | 236 | 214 | 74 | 67 | 585[a] | 531 | 585 | 531 | 243 | 220 |
| Total compliance with current, approved SIP Regulations. | 70 | | | | | | | | | | | | |
| Total Gasoline Throughput ≥20,000 Gal/Mo. | 70 | 1723 | 1563 | 236 | 214 | 74 | 67 | 585 | 531 | 585 | 531 | 243 | 220 |
| Total Gasoline Throughput ≥4,000 Gal/Day | 54 | 2095 | 1900 | 236 | 214 | 226 | 206 | 695 | 630 | 695 | 630 | 243 | 220 |
| Throughput to Non-Exempt Accounts ≥2,000 Gal/Day | 36 | 2499 | 2266 | 236 | 214 | 392 | 356 | 814 | 738 | 814 | 738 | 243 | 220 |
| Throughput to Non-Exempt Accounts ≥2,000 Gal/Day or Total Gasoline Throughput ≥4,000 Gal/Day | 34 | 2566 | 2326 | 236 | 214 | 419 | 380 | 834 | 756 | 834 | 756 | 243 | 220 |
| Total Gasoline Throughput ≥8,000 Gal/Day | 29 | 2678 | 2428 | 236 | 214 | 465 | 422 | 867 | 786 | 867 | 786 | 243 | 220 |
| Total Gasoline Throughput ≥8,000 Gal/Day or Throughput to Non-Exempt Accounts ≥2,000 Gal/Day | 20 | 2872 | 2604 | 236 | 214 | 545 | 494 | 924 | 838 | 924 | 838 | 243 | 220 |
| Total Gasoline Throughput ≥12,000 Gal/Day | 11 | 3084 | 2796 | 236 | 214 | 631 | 572 | 987 | 895 | 987 | 895 | 243 | 220 |
| Total Gasoline Throughput ≥12,000 Gal/Day or Throughput to Non-Exempt Accounts ≥2,000 Gal/Day | 9 | 3132 | 2840 | 236 | 214 | 651 | 590 | 1001 | 908 | 1001 | 908 | 243 | 220 |
| Total Gasoline Throughput ≥20,000 Gal/Day[d] | 2 | 3294 | 2986 | 236 | 214 | 717 | 650 | 1049 | 951 | 1049 | 951 | 243 | 220 |
| No Plants in Compliance | 0 | 3342 | 3030 | 236 | 214 | 737 | 668 | 1063 | 964 | 1063 | 964 | 243 | 220 |

[a] It is assumed that deliveries to exempt accounts are done with trucks without vapor recovery

[b] T/Yr = Tons/Years

[c] MT/Yr = Metric Tons/Year

[d] Current Texas State Regulation V incorporates this exemption

Over 70% of the bulk plants have already installed Phase I vapor control systems and over 30% have installed Phase II control systems in order to comply with these regulations.

## E. DIRECT COSTS OF EMISSION CONTROL SYSTEMS

Initial costs of hydrocarbon control systems are reviewed in the sequential order in which gasoline is received and then transferred from bulk plants: incoming transfer, storage, outgoing transfer and operating and maintenance costs.

### 1. Modification of Incoming Transports

Because a gasoline transport may be owned by a major oil company or a common carrier or it could be used to deliver other highly volatile organic materials the cost of installing gasoline vapor recovery equipment on a transport can not be considered a necessary portion of a bulk plants direct expense.

Cost estimates for installing vapor recovery and bottom loading on a supply transport have been obtained for general information. They range from $1000 to $1800 per compartment, with the total cost depending on the truck configuration. The most common truck design has three or four compartments, and the average conversion price per compartment is $1200, so the total cost is $3600 to $4800. The most expensive conversion cost quoted by any operator was $8000.

Trucks originally designed for top loading are generally being modified to provide for bottom loading and vapor recovery at the same time. Bottom loading of transports is frequently cited as necessary in order to be compatible with loading facilities at the particular terminal supplying the bulk plant. However, a terminal may also supply bulk plants located outside the affected AQCRs, so that some terminals have maintained top loading facilities with vapor recovery capability.

### 2. Submerged Fill Installation

A common requirement for filling storage tanks is that the discharge opening be within 6 in (15 cm) of the tank bottom. Underground tanks therefore need to be equipped with a submerged fill pipe or drop tube such as OPW 61-T. The cost of this hardware is minimal and installation is quite simple.

### 3. Balance System Installation Costs

The balance system is the most common method of controlling emissions from filling and emptying storage tanks. The table below summarizes the initial cost data obtained for installations in Baltimore/Washington, D.C. and Houston/Galveston.

Initial Cost of Vapor Balance System at Bulk Plant
for Incoming Loads

| Area | Number of Contacts | Costs ($1000) Low | Average | High |
|---|---|---|---|---|
| Baltimore/Washington | 17 | .8 | 3.6 | 10 |
| Houston/Galveston | 5 | .6 | 2.9 | 5 |
| Type of installation | | | | |
| Aboveground tanks | 17 | .6 | 3.6 | 10 |
| Underground tanks | 4 | 1.5 | 2.7 | 3.6 |
| Operator installed | 5 | .6 | 1.5 | 3.5 |
| Contractor installed | 3 | 1.3 | 4.0 | 10 |

Initial cost includes hardware and installation. Typical hardware for aboveground tanks includes piping, fittings, supports, pressure-vacuum (PV) valves, liquid traps, paint, disconnects, seals and gaskets. Typical installation work includes draining the tank, assembling piping and supports, breaking into existing tank top or vent, painting, leak testing, replacing PV valve, replacing seals and occasionally repairing leaks by welding tanks or covers. Miscellaneous costs include permit fees, inspection, insurance, temporary barricades and cleanup. Costs listed do not include facility down-time, contract negotiation time, design and drafting, and time to obtain financing.

If underground tanks require only a coaxial fitting such as Emco Wheaton F-298, a typical installed cost is $600. A small diameter fill port, side fill, PV vent requirements, leaks, concrete work and overfill protection can raise the cost significantly. However, the cost of installing a balance system on an underground tank is generally lower than the installation on an aboveground tank.

In about 30% of the cases studied, the operators performed the installations. Although some direct labor costs were included in the estimate, costs generally represent only hardware costs. These installation costs will not be included in the average cost of a control system for incoming loads because of: (1) general lack of associated labor costs, (2) discrimination against those not able to install by themselves.

If a typical bulk plant with aboveground storage tanks is used as a base, the average and range of costs derived from major oil companies, contractors and operators is fairly consistent with the average cost being about $3000. The overall range was $600 to $7000.

Very detailed data on Phase I vapor recovery costs were obtained from a representative of an independent oil company which presently operates seven bulk plants within the Baltimore and National Capital AQCRs. Equipping their transports with vapor recovery has averaged $3500/truck. Installing a balance system to comply with Phase I has cost between $1300 and $7000. The highest cost resulted from having to run piping an unusually long distance to connect all storage tanks.

The technique this company is using to equip storage tanks with vapor recovery devices is quite interesting. All modifications are being installed in the manhole covers of aboveground tanks. Essentially a ball vent valve (Universal Valve Co. #37, with a three inch float) a combination vent gauge hatch (McDonald 925-U) are installed in the manhole cover, then a tight seal coupler is attached to the ball vent valve line. This then provides a means of manifolding together however many tanks are needed.

### 4. Outgoing Gasoline Transfer Control Costs

Data from both this study and previous work (1) indicate a significant difference in the cost of installing a top loading vapor recovery system compared with a bottom loading vapor recovery system. The industry has generally emphasized the conversion of top loading racks to bottom loading racks. This has resulted in the reporting of costs which are biased toward the more expensive system.

In conducting this study, over a third of the facilities visited in the Houston/Galveston area were found to have installed a top loading vapor balance system on their loading racks and smaller delivery trucks. (The details of this system have been given in Section III). Four major oil companies who have used this approach provided reasonably detailed cost data: 1) modifying the loading rack--necessary piping, fittings and hoses--will cost approximately $3000 to $5000; 2) adapting the account trucks--submerged fill tubes, fittings and overfill protection--will cost between $2000 and $4000. Therefore, for the installation of Phase I and Phase II vapor recovery at the bulk plant and the modification of one account truck, the total cost to the bulk plant would be between $8000 and $12000.

Only one East Coast firm interviewed had obtained a bid (of $13000) for a top loading Phase II vapor recovery installations.

Because top loading vapor recovery appears to be a less expensive means of controlling hydrocarbon vapors from bulk plant outgoing transfer operations and because cost data are sparse, an in-depth study of installation costs, system design and efficiency appears warranted.

With regard to bottom loading vapor recovery systems, only one plant in the Baltimore AQCR had installed this equipment. In 1974 this plant totally replaced its loading rack. The equipment cost then was $12000 and the labor cost was $9000. Allowing for an annual cost increase of 10%, this same installation would probably now cost about $28000. The only other bulk plant in the Baltimore area which had considered a similar installation had received a bid of $24000. The difficulty in interpreting this quote, and most others for bottom loading system, is establishing how much was spent in modernizing the facility and how much was spent in order to comply with vapor control regulations.

Very little more was learned about the possibility of converting from top loading to bottom loading. If the conversion can be accomplished by removing the loading arms at the level of the rack and replacing them with flexible connecting hoses, the cost would be between $8,000 and $14,000, depending upon the need for new meters, electrical controls, etc. A completely new loading rack for three grades of gasoline was estimated at $19,000.

### 5. Modification of Account Trucks

As mentioned above, oil companies in Texas who have used an approach of installing vapor tight connections on top loading account trucks have spent $2,000 to $4,000 per truck.

Those few operators who planned to continue top loading with such vapor recovery systems as OPW V-63-F estimated installing vapor recovery on their account trucks would average $2,500 per truck.

Operators who converted their small trucks to bottom loading and installed vapor recovery spent from $3,000 to $6,000, depending upon the existing design of the truck.

### 6. Cost of Vapor Recovery Equipment on Customer Tanks

The first problem encountered is that of who is responsible for any modifications which may be needed -- the supplier or the user. At this time, it seems to depend totally on the individual operator's business judgment. The costs are generally $200 to $600 per tank, so for a bulk plant servicing say 50 non-exempt tanks, the total cost would be quite substantial. On the other hand, a user would probably not have more than three non-exempt tanks, which would involve a maximum expenditure of about $2,000.

### 7. Operating and Maintenance Costs

Only a few bulk plant operators have had long-term experience with vapor recovery systems. Thus, cost information is limited. Maintenance costs for vapor balance and bottom-loading are generally expected to be small. Transfer hoses and mating fittings will require replacement. Installation of automatic controls for loading and unloading of gasoline may impose additional maintenance requirements. No direct information on operating costs was available.

Based upon experience with balance systems in service stations, one major oil company estimated the annual costs of a balance system in a bulk plant to be apportioned as follows:

| | Percent of initial system cost |
|---|---|
| Interest (8 years at 10%) | 6.2 |
| Depreciation | 12.5 |
| Property taxes | 2.5 |
| Maintenance | 3.0 |
| | 24.2 |

Thus, if a bulk plant installs a vapor recovery system for an initial cost of $10,000 the operator may expect to spend nearly $2,500 a year to operate and properly maintain the equipment.

Any increase in facility value should increase assessments, thereby increasing taxes. The amount will vary with tax rates and assessments.

Possible increases in insurance rates due to vapor balancing have not been resolved. To date, insurance companies have not indicated a change in rate due to any change in risk category.

Although information on these miscellaneous costs is limited, it appears that; (1) operating of maintenance costs for vapor recovery may be significant and (2) the primary impact is directly related to the initial cost.

# V. PROJECT APPROACH AND METHODOLOGY

## A. INFORMATION SOUGHT ABOUT BULK PLANTS

### 1. Inventory of Bulk Plants

An inventory of petroleum bulk plants for the National Capital, Baltimore and Houston/Galveston AQCRs was prepared from information obtained by contacting the several governmental regulatory agencies concerned and has been presented in Section III. The agencies contacted include Region III and Region VI office of the EPA, Maryland State Department of Health and Mental Hygiene, District of Columbia Department of Environmental Services, Virginia State Air Pollution Control Board, Texas Air Control Board, Harris County Pollution Control Department, Galveston County Health District and City of Houston Department of Public Health. In addition, various industry associations, including (1) Texas Oil Marketers Association, (2) Maryland Oil Jobbers Council, (3) Virginia Petroleum Jobbers Association, and major integrated oil companies were also contacted. Local business and even telephone directories were used to supplement the inventory. Telephone, and personal inquiries were made to gather these data.

### 2. Physical Description of Plants

An adequate physical description of a bulk plant included the number and capacity of storage tanks, whether they were above or below ground, the number and capacity of trucks, and the type of loading used. The vapor recovery system would be described by type, manufacturer and installer. Bulk plant owners and operators were the sources of information.

### 3. Bulk Plant Operations

Questions to be answered concerning a bulk plant's operation focused on sales, expenses and profits. Total gasoline throughput at the bulk plants, the amount of gasoline transported directly from the terminal to the customer, and estimates of the amount of gasoline sold to agricultural accounts and accounts having tanks of less than 2,000 gal (7,600 l.), i.e., exempt accounts, were all information requested from the operators and owner. In addition, to better assess the financial impact of vapor recovery installations on these bulk plants, operators were questioned about annual sales, sales of other products, margins, operating expenses, gross or net profits, total assets, net worths, long term market, value of the facility and future of the business.

### 4. Cost of Vapor Recovery

It was planned to try to determine the cost of buying and installing each increment of equipment required in the plant and the cost of modifying trucks. Among operating and maintenance costs were included changes in taxes, insurance and in the time required to load or deliver product.

Cost data were obtained from owners and operators, equipment manufacturers and contracts.

### 5. Financial Impact of Vapor Recovery

The financial impact of installing vapor recovery on specific bulk plants was examined by seeking fiscal data from the operators about annual sales, expenses, margins, profits, assets, debts, original investment and current market value. The owners were asked for their own evaluation of what each could afford. An attempt was also made to learn how the bulk plant owners' actions would affect customers.

Because only a relatively small amount of detailed financial information was available from individual plants, financial statements were created for seven hypothetical, but probable operations, based upon summary data published by Robert Morris Associates for bulk petroleum wholesalers. An estimation of the financial impact of vapor recovery expenses in excess of $10,000 by each of the seven firms could then be made. The results and a detailed description of the evaluating process is in Section VI . This approach also reduced the problems of correlating businesses with substantial variabilities in sales, profits, rates of return, etc.

## B. SOURCES OF DATA

Personal interviews were the principal means of interviewing people throughout the industry. Written communications and phone contacts supplemented the data gathering portion of this task. Agencies, individual and associations contacted included:

1. Various state and local air pollution control agencies (11)
2. Bulk plant operators (59)
3. Industry associations (3 )
4. Major oil company representatives (10)
5. Miscellaneous Federal and state agency representatives (5 )

Data obtained for preceding studies (1, 2) were used again as background information for this task.

## C. DATA GATHERING IN THE FIELD

State and local governmental agencies were contacted to obtain information about air pollution control regulations applicable to bulk plants, the total gasoline consumption in each AQCR and the distribution market share for bulk plants, hydrocarbon emission estimates, plant inventories and an overview of the agency's perspective of bulk plants.

Industry associations were notified of the intended work. At least one made a substantial effort to help by discussing the project in their monthly newsletter and informing members of planned interviews.

A standardized group of questions was prepared for interviewing bulk plant operators. A sample copy is shown in Appendix D.

Almost all bulk plant operators were contacted on facilities, throughputs and customers were available. Financial information was more sparse, but almost all operators readily discussed how vapor recovery would affect them.

A list of all contacts is available in Appendix E.

# VI. FINANCIAL ANALYSIS

Determining the financial structure and capability of typical bulk plants is a very difficult matter. Many of these firms are in businesses other than just the wholesale marketing of gasoline. They sometimes own gasoline stations and sell tires, batteries and accessories (TBA) in addition to gasoline and other petroleum products. It is also quite difficult to define what one means by typical in terms of location, customer set, sales volume, additional lines of business, profitability and asset value.

Bulk plants operate in market environments that vary in competition due to the make up of their respective customer sets. These markets range from being virtually monopolistic to being highly competitive. Consequently, a bulk plant operator must react in a manner that is sensitive to his environment while considering the range of alternatives available to his customers.

Both bulk plant operators and their customers are prepared to modify their actions to take advantage of changing market conditions. The operators will seek to raise prices and curtail services in order to maintain or increase profit margins. On the other hand, their customers will seek to obtain special services and lower prices for gasoline. The degree of existing competition will be the major determinant in resolving this conflict. In addition, the bulk plant operator may sometimes be able to purchase product from his supplier at a reduced price to enable him to supply gasoline to a particular group of customers at a given price.

In an earlier study (1) PES carried out a financial analysis of small gasoline bulk plants. Data gathered in this current study have generally agreed with the data from the earlier study, and indicate that the first financial analysis is still valid. The Market Analysis and Financial Analysis sections from reference (1) are reproduced in Appendix F of this report for the convenience of the reader. The analysis showed that the critical financial factor was the ability of the plant owner to obtain funds for the initial investment in vapor recovery equipment of approximately $10,000. Plants with annual throughputs less than 600,000 gallons (2,300,000 liters) are unlikely to qualify for loans. Firms with assets between $50,000 and $750,000 were considered from the point of view of their debt structure, working capital position and profitability of the enterprise. Small Business Administration and Pollution Control Financing Authority loans were considered along with conventional bank loans. Tax incentives were evaluated and found to be of minor assistance unless the firm is enjoying profits.

# APPENDIX A

# INVENTORY OF GASOLINE BULK PLANTS IN AIR QUALITY CONTROL REGIONS SURVEYED

# GASOLINE BULK PLANTS IN BALTIMORE AND NATIONAL CAPITAL AIR QUALITY CONTROL REGIONS

## MARYLAND

### BALTIMORE COUNTY

Amoco
Town: Owings Mills
Street: 75 Gwynns Mill Court
Phone: 655-4228

Clark Oil Company
Town: Phoenix
Street: 2815 Merrymens Mills Road
Phone: 666-2280

Ewbank-Walsh Oil Co.
Street: 6923 Ebenezer Road
Phone: 335-5220

Amoco
Town: Cockeysville
Street: 10825 Beaver Dam Road
Phone: 666-2270

Wilhelm Oil Service
Town: Randallstown
Street: 9502 Liberty Road
Phone: 922-6666

### CARROLL COUNTY

S.L. Bare
Town: Westminster
Street: 8 Sullivan Avenue
Phone: 848-4080

Southern States Co-op
Carroll Petroleum Service
Town: Westminster
Street: 121 John Street
Phone: 848-9420

Eagle Oil Company
Town: Westminster
Street: 229 East Green Street
Phone: 848-4610

## CARROLL COUNTY (continued)

S. Lease Warner
Town: Westminster
Street: 509 Old Westminster Pike
Phone: 848-4477

Palmer Petroleum
Town: Westminster
Street: 80 John Street
Phone: 848-8600

S.H. Tevis and Son
Town: Westminster
Street: 82 John Street
Phone: 848-4433

A.E. Wright and Son
Town: Westminster
Street: 732 Spring Mills School Road
Phone 848-7686

Walsh Fuel & Supply Co.
Greenmount Fuel Company
Town: Hampstead
Phone: 374-9081
374-4167
374-4865
374-4473

## HARFORD COUNTY

B.P. Oil
Town: Aberdeen
Street: 607 Old Philadelphia Road

Grier Oil Company
Town: Aberdeen
Street: North Philadelphia Road
Phone: 272-2060

Amoco
Town: Bel Air
Street: 501 North Main Street
Phone: 838-7333
879-9474

Corbin Fuel Company
Town: Bel Air
Street: 33 Ellendale Street
Phone: 838-3590

## HARFORD COUNTY (continued)

Southern States Co-op Inc.
Bel Air Petroleum Service
Town: Bel Air
Street: 423 Rock Spring Avenue
Phone: 838-5600

Bay Oil Company
Town: Havre de Grace
Street: 2110 Pulaski Highway
Phone: 939-1010

Friendly Oil Company
Town: Havre de Grace
Street: US Route 40 West from Havre de Grace
Phone: 939-3300

J. Lawson Gilbert Dist.
Town: Havre de Grace
Street: Water Street
Phone: 939-2424

Holter's Incorporated
Street: 901 Pulaski Highway
Phone: 676-0600

Kurtz and Kahoe Oil
Town: Forest Hill
Street: 322 Bynum Road
Phone: 838-6910
879-2655

Whiteford Oil
Town: Whiteford
Phone: 452-5660

Heaps Oil Company
Town: Cardiff
Phone: 452-8383

## HOWARD COUNTY

Southern States Co-op Inc.
Town: Ellicott City
Street: 10065 Baltimore National Pike

## MONTGOMERY COUNTY

Stup and Costello
Town: Gaithersburg
Street: 465 East Diamond Ave.
Phone: 926-0115

Southern States Co-op Inc.
Gaithersburg Petroleum Services
Town: Gaithersburg
Street: 8 South Summit Avenue
Phone: 926-2600
948-3100

Alco Oil Co.
Town: Rockville
Street: 14915 Southlawn Lane

Wash Petroleum Products
Town: Kenwood
Street: 5450 Butler Road
Phone: OL4-1274

G.D. Armstrong Company
Town: Laytonsville
Phone: 948-1902

## PRINCE GEORGE'S COUNTY

Amoco
Town: Landover
Street: Ardwick and Ardmore Roads

Early Petroleum Services
Town: Brandywine

Berwyn Fuel Incorporated
Town: Laurel
Street: 101 Laurel Avenue

Upper Marlboro Co-op
(Southern States)
Town: Upper Marlboro
Street: 15510 Marlboro Pike

## ANNE ARUNDEL COUNTY

Amoco
Town: Annapolis
Street: 308 First Street
Phone: 263-2307

## ANNE ARUNDEL COUNTY (continued)

Southern Maryland Oil Co.
Town: Annapolis
Street: 2023 Bestgate Road
Phone: 267-8629

Eastern Petroleum Corporation
Town: Annapolis
Street: 7 Hudson Street
Phone: 263-0222

Annapolis Utilities
Town: Annapolis
Street: 1829 George Street (office)
Phone: 268-5055

Hardesty and Monroe
Town: Edgewater
Phone: 956-2414
269-5584 (from Baltimore)

R.S. Leitch Company
Town: Edgewater
Phone: 261-4041

# VIRGINIA

## ALEXANDRIA CITY

Fannon Petroleum Co.
Town: Alexandria
Street: 1308 Duke
Phone: 836-1133

## FAIRFAX COUNTY

Quarles-Robertson Oil, Inc.
Town: Fairfax
Street: 8902 Lee Highway
Phone: 573-5800

Southern States Co-op Inc.
Town: Fairfax
Street: 3590 Chain Bridge Road
Phone: 273-2345

## FAIRFAX COUNTY (continued)

Northern Virginia Oil
Town: Vienna
Street: 344 Mill
Phone: 938-6834

Potomac Oil
Town: Springfield
Street: 7101 Wimsett
Phone: 941-4500

## LOUDOUN COUNTY

Southern States Co-op, Inc.
Town: Leesburg
Street:Near Catoctin Circle
Phone: 777-2431

Leesburg Oil Co. Inc.
Town: Leesburg
Street: Near Catoctin Circle
Phone: 777-3002

Community Oil Co.
Town: Leesburg
Street: 58 S. Wirt St.
Phone: 777-2092

Blankenship Oil Corp.
Town: Leesburg
Street: Harrison Street
Phone: 777-4131

Hatcher-Wynkoop Oil Co. Inc.
Town: Leesburg
Street: 45 S. Catoctin Circle
Phone: 777-1184

Moorcones, Inc.
Town: Purcellville
Street: Route 7 East
Phone: 338-7186

Thompson Oil Co., Inc.
Town: Purcellville
Street: 21st and O Street
Phone: 338-7196

Middleburg Oil Corp.
Town: Middleburg
Street: Federal
Phone: 687-6326

# GASOLINE BULK PLANTS IN HOUSTON/GALVESTON AREAS

## BRAZORIA COUNTY

D.D. Clark Oil Co.
Town: Alvin
Street: 4502 Hwy 35
Contact: D.D. Clark
Telephone: (713) 331-3631

Gulf Oil
Town: Alvin
Street: South Street
Telephone: (713) 331-3445

Lion Oil Co.
Town: Alvin
Street: 2411 1/2 South Gordon
Telephone: (713) 331-4255

Mobil Oil Co.
Town: Alvin
Street: 308 N. Taylor
Contact: George Warfield
Telephone: (713) 331-4101

Phillips 66
Town: Alvin
Street: Hwy 6 & Hwy 35 Bypass
Contact: George Monteau
Telephone: (713) 585-4431

Continental Oil Co.*
Town: Angelton
Street: E. Hwy 35
Telephone: (713) 849-7565

Exxon
Town: Angelton
Street 227 S. Front
Contact: Ben Magness
Telephone: (713) 393-1010
(713) 849-7122

BRAZORIA COUNTY (continued)

Farmers Oil Co.
(Mobil Distributor)
Town: Angelton
Street: 139 S. Front
Contact: Brian Steves
Telephone: (713) 849-5501

Texaco
Town: Angelton
Street: 215 S. Front
Contact: R.B. Stewart
Telephone: (713) 849-7471

Merrills Phillips 66*
Town: Brazosport
Street: 1912 Brazosport Blvd.
Telephone: (713) 233-5031

Texaco*
Town: Brazosport
Street: 629 E. 2nd
Telephone: (713) 233-5275

Vickers V (Mobil)*
Town: Brazosport
Street: Park Avenue
Telephone: (713) 233-3291

Wruck Oil Co.
(Texaco Distributor)
Town: Damon
Street: 211 Mulcahy
Telephone: (713) 742-3223

Furnace Todd Consignee, Inc.
Town: Manvel
Street: W. Hwy 6
Telephone: (713) 489-8132

Phillips
Town: Pearland
Street: 2222 North Main
Contact: E.E. Martin
Telephone: (713) 485-1402

## CHAMBERS COUNTY

Enderli Oil Co.
Town: Mount Bellview
Contact: Larry Enderli
Telephone: (713) 427-4416

Edmunds Oil Co.
Town: Winnie
Contact: Mr. Edmunds
Telephone: (713) 296-2106
(713) 296-2345

Exxon
Town: Winnie
Contact: Mr. Miguez
Telephone: (713) 296-2041

Gulf Oil
Town: Winnie
Contact: Pat McGowan
Telephone: (713) 296-2312

## FORT BEND COUNTY

Exxon
Town: Katy
Street: Hwy 90 (Business)
Contact: Arthur Miller
Telephone: (713) 371-2613
(713) 371-2703

Gulf Oil
Town: Katy
Street: 5601 1st
Contact: D.G. Thompson
Telephone: (713) 371-3121

Mobil Oil
Town: Katy
Street: 5610 1st
Contact: Van Scoggins
Telephone: (713) 371-2266

Stavinoha Petrol Supply
Town: Needville
Street: 10003 FM Rd. 360
Telephone: (713) 793-6105

## FORT BEND COUNTY

ARCO
Town: Richmond
Street: Austin St.

Blase Oil Co.
Town: Rosenburg
Street: 1023 Ave. H
Telephone: (713) 232-3831

Exxon
Town: Rosenburg
Street: 2317 Avenue F
Contact: Mr. Bernhausen
Telephone: (713) 342-4511

Gulf Oil
Town: Rosenburg
Street: 1417 Avenue G
Contact: Mr. Krolcyzk
Telephone: (713) 342-2162

Mobil Oil
Town: Rosenburg
Street: 2290 Avenue F
Contact: Clarence Foss
Telephone: (713) 342-2211

Exxon
Town: Sugar Land
Street: 406 Imperial
Contact: Janice Armstrong
Telephone: (713) 494-2224

## GALVESTON COUNTY

Gulf Oil
Town: Galveston
Street: 1802 Water
Contact: Roland Kuhn
Telephone: (713) 763-6466
(713) 488-3326

## GALVESTON COUNTY (continued)

Mobil Oil
Town: Galveston
Street: 1202 Water
Telephone: (713) 765-5517

## HARRIS COUNTY

Enderli Oil Co. (Phillips)
Town: Baytown
Street: 1300 N. Alexander
Contact: Larry Enderli
Telephone: (713) 427-4416

Exxon*
Town: Baytown
Telephone: (713) 422-2273

Gulf Oil
Town: Baytown
Street: 810 N. Main
Contact: Mr. Barrow
Telephone: (713) 427-4017

Texaco
Town: Baytown
Street: 2700 N. Main
Contact: Dennis Trigg
Telephone: (713) 427-0576

Bay Oil Co.
Town: Houston
Street: 408 Jensen
Contact: Harvey Smith Jr.
Telephone: (713) 228-6388

Glaw Oil Co.
Town: Houston
Street: 4010 McKinney
Contact: Bill Glaw
Telephone: (713) 222-8391

Harco Oil Co.
Town: Houston
Street: 3601 McKinney
Contact: Oliver Pearson
Telephone: (713) 236-1331

## HARRIS COUNTY (continued)

Harris County Oil Co.
Town: Houston
Street: 3325 W 11th
Contact: George Franklow Jr.
Telephone: (713) 861-8115

Springer Oil Co.
Town: Houston
Street: 642 W. Gulf Bank
Contact: Jim Springer
Telephone: (713) 447-6328

Star-Tex Oil Co.
Town: Houston
Street: 5708 Harvey Wilson
Contact: Bob Harron
Telephone: (713) 675-6506

Texas Gulf Gas Corp.
Town: Houston
Street: 6734 Winton
Telephone: (713) 747-6113

Tommie Hines Oil Co.
Town: Houston
Street: 7701 Almeda
Contact: Carl Shiro
Telephone: (713) 747-4440

Lindsay Oil Co. of Texas*
Town: Humble
Street: 6606 FM Rd. 1960
Telephone: (713) 444-3038

Apache Oil Co.*
Town: Pasadena
Street: 2709 Dewberry
Telephone: (713) 946-5785

Dickson Oil Co.*
(Gulf Oil)
Town: Pasadena
Street: 4830 Red Bluff
Telephone: (713) 487-1318

## HARRIS COUNTY (continued)

Herbert H. Bishop*
(Texaco)
Town: Pasadena
Street: 1004 E. Pasadena Frwy
Telephone: (713) 447-3589

Exxon
Town: Tomball
Contact: Mr. Nichol
Telephone: (713) 351-1871

## LIBERTY COUNTY

Cleveland Oil Co.
Town: Cleveland
Street: 324 San Jacinto
Telephone: (713) 592-3961

Gulf Oil Co.
Town: Cleveland
Street: Hwy 321
Telephone: (713) 592-5891

Harris Petroleum Co.
(Shell)
Town: Cleveland
Street: 340 San Jacinto
Telephone: (713) 592-8012
(713) 592-8161

McMahon Oil Co.
(Conoco)
Town: Cleveland
Street: 315 S. Washington
Telephone: (713) 592-3531

Texaco
Town: Cleveland
Street: 332 San Jacinto
Contact: Mr. Pursley or Mr. Keeland
Telephone: (713) 592-3831

Exxon
Town: Dayton
Street: 112 Bryan
Contact: J.B. Sterling
Telephone: (713) 258-2633

## LIBERTY COUNTY (continued)

Lowe Oil Co.
Town: Dayton
Street: 306 Lowe
Contact: Vern Lowe
Telephone: (713) 258-2245

ARCO
Town: Liberty
Street: Old Beaumont Hwy
Telephone: (713) 336-3131

Gulf Oil
Town: Liberty
Street: 500 W. Hwy 90
Contact: John Herbert
Telephone: (713) 336-5232

Mobil Oil
Town: Liberty
Street: 504 W. Hwy 90
Contact: Mr. Silhavy
Telephone: (713) 336-3332

Texaco
Town: Liberty
Street: 105 Crockett
Telephone: (713) 336-3892

## MATAGORDA COUNTY

Evans Oil Co.
Town: Bay City
Street: 2300 7th (Hwy 60)
Contact: Mr. Evans
Telephone: (713) 245-2981

Exxon
Town: Bay City
Street: Hwy 60
Contact: Mike Pruit
Telephone: (713) 245-2201

MATAGORDA COUNTY (continued)

Gulf Oil
Town: Bay City
Street: 2705 Avenue F
Contact: Bob Brown
Telephone: (713) 245-2901

Hurley Oil Co.
(Phillips)
Town: Bay City
Street: West Columbia Hwy
Contact: Frank Hurley
Telephone: (713) 245-2462

Savco
(Shamrock)
Town: Bay City
Street: 2617 Avenue C
Contact: Jim Kovar
Telephone: (713) 245-9161

Speedway Oil Co.
Town: Bay City
Street: 2300 7th (Hwy 60)
Contact: J.D. Berryman
Telephone: (713) 245-4844

Texaco
Town: Bay City
Street: 1821 Avenue C
Contact: Eddie Nedbalek
Telephone: (713) 245-4891

MONTGOMERY COUNTY

Carco Oil Co.
Town: Conroe
Street: 108 E. Davis
Telephone: (713) 756-2229

Exxon
Town: Conroe
Street: 103 N. First
Contact: John Stubbs
Telephone: (713) 756-4020

## MONTGOMERY COUNTY (continued)

Gulf Oil
Town: Conroe
Street: 123 Avenue A
Contact: T.C. Brannon
Telephone: (713) 756-2214

Russ Clantan Oil Co.
Town: Conroe
Street: 715 Dallas
Contact: Russ Clanton
Telephone: (713) 756-3521

Texaco
Town: Conroe
Street: Hwy 45
Contact: Bill Pursley
Telephone: (713) 756-4469

## WALLER COUNTY

Calhoun Distributing Co.
Town: Hempstead
Street: 1502 St. Mary's St.
Contact: Gerald Calhoun
Telephone: (713) 826-2235

Exxon
Town: Hempstead
Street: 1446 St. Mary's St.
Contact: J.C. Hicks
Telephone: (713) 826-2231

Texaco
Town: Hempstead
Street: 1346 St. Mary's St.
Contact: Roy Cook
Telephone: (713) 826-3340

*Plants which could not be located or verified as bulk plants

# APPENDIX B

# VAPOR RECOVERY REGULATIONS EFFECTIVE IN BALTIMORE AQCR AND NATIONAL CAPITAL AQCR

Maryland State Department of Health and Mental Hygiene
201 W. Preston Street
Baltimore, Maryland 21201

(As Amended through June 17, 1975)

10.03.38 Regulations Governing the Control of Air Pollution in Area III*

Pursuant to the authority conferred upon the Secretary of Health and Mental Hygiene by Article 43, Section 697, Annotated Code of Maryland, 1957 Edition, and Supplement, the following regulations governing the control of air pollution in Area III are hereby established as requirements of the Department of Health and Mental Hygiene.

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* **Baltimore Metropolitan Area comprising Baltimore City and Anne Arundel, Baltimore, Carroll, Harford and Howard Counties.**

J. Hydrocarbons From Other Than Fuel Burning Equipment.

(1) Definitions for purposes of these regulations:

a. "Architectural Coating" shall mean any coating used for residential, commercial or industrial buildings and their appurtenances.

b. "Motor Vehicle Fuel" shall mean motor vehicle fuel as defined in Article 56, Section 135(b) of the Annotated Code of Maryland.

c. "Organic Material" shall mean chemical compounds of carbon excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbonates, metallic carbides and ammonium carbonates.

d. "Organic Solvent" shall mean any organic material which is liquid at standard conditions and which is used as a dissolver, viscosity reducer or cleaning agent.

e. "Photochemically Reactive Organic Solvent" shall mean any organic solvent with an aggregate of more than 20% of its total volume composed of the chemical compounds classified below or which exceeds any of the following individuals percentage composition limitations referred to the total volume of solvent:

(1) A combination of hydrocarbons, alcohols, aldehydes, esters or ketones any of which has an olefinic or cyclo-olefinic type of unsaturation: 5%.

(2) A combination of aromatic compounds with eight or more carbon atoms to the molecule except ethylbenzene: 8%.

(3) A combination of ethylbenzene, ketones having branched hydrocarbon structures or toluene: 20%.

Whenever any organic solvent or any constituent of an organic solvent may be classified from its chemical structure into more than one of the above groups or organic compounds, it shall be considered as a member of the most reactive chemical group, that is, that group having the least allowable percent of the total volume of solvents.

For architectural coatings only, the volume of water contained in the solvent may be used to compute the total volume of the solvent in determining percentages of photochemically reactive organic solvents.

f. "Reid Vapor Pressure" shall mean the absolute pressure in pounds per square inch determined at 100°F and v/l = 4 (ratio of vapor volume to liquid volume, as defined in ASTM designation D 323-58) by using apparatus and procedures as standardized under the auspices of the American Society for Testing and Materials.

g. "True Vapor Pressure" shall mean the absolute pressure in pounds per square inch determined at storage conditions. Storage conditions shall be taken as the average monthly temperature. If the storage is subject to solar and ambient heat gain only, the temperature shall be taken as the average monthly temperature to a maximum average of 78°F (average storage temperature for May through September). True vapor pressure shall be determined by measurement at the storage conditions or by the use of a nomograph, published by the Coordinating Research Council and included with these regulations as Figure 1, relating true vapor pressure to Reid Vapor Pressure and storage temperature.

h. "Vapor Balance Line" shall mean any connection closed to the atmosphere between the vapor space of two storage containers that will allow the vapors to be displaced as the liquid is transferred from one tank to the other.

i. "Photochemically Reactive Organic Materials" shall include any of the following:
   - (1) Hydrocarbons, alcohols, aldehydes, esters or ketones any of which has an olefinic or cyclo-olefinic type unsaturation,
   - (2) Aromatic compounds with 7 or more carbon atoms,
   - (3) Ketones having branched hydrocarbon structure,
   - (4) Motor vehicle fuel with a true vapor pressure greater than 1.5 psia at 78°F,
   - (5) Organic solvents which have been in direct contact with flame in the presence of oxygen,
   - (6) Compounds emitted from a process in which organic solvents are baked, heat cured or heat polymerized in the presence of oxygen.

(2) Organic Material.

a. After January 1, 1973, a person shall not cause or permit organic material having a true vapor pressure in the range of 1.5 to 11 psi inclusive to be placed, stored or held in any existing stationary tank reservior with a capacity of greater than 65,000 gallons, or in any new stationary tank reservior with a capacity of greater than 40,000 gallons unless the tank is equipped with one or more of the following organic material vapor control devices, properly installed, well-maintained and in operating condition.
   - (1) A floating roof resting on the surface of the liquid contents equipped with a closure seal, or seals, to close the space between the roof edge and tank wall, and in addition, all tank gauging and sampling devices shall be gas-tight except when in use, or
   - (2) A pressure tank system maintaining a pressure at all times so as to prevent organic material loss to the atmosphere, or
   - (3) A vapor recovery system capable of collecting the organic materials emitted from the tank and disposing of these emissions so as to prevent their emission to the atmosphere, and in addition, all tank gauging and sampling devices shall be gas-tight except when in use, or
   - (4) Other equipment equal or greater in efficiency to those devices listed above, and approved by the Department.

b. After January 1, 1973, a person shall not cause or permit organic materials having a true vapor pressure greater than 11 psi to be placed, stored or held in any existing stationary tank reservior with a capacity of greater than 65,000 gallons, or in any new stationary tank reservior with a capacity greater than 40,000 gallons unless equipped with one of the following organic material vapor control devices properly installed, well-maintained and in operating condition:
   - (1) A pressure tank system maintaining a pressure at all times so as to prevent organic material loss to the atmosphere, or

(2) A vapor recovery system capable of collecting the organic materials emitted from the tank and disposing of these emissions so as to prevent their emission to the atmosphere, and in addition, all tank gauging and sampling devices shall be gas-tight except when in use, or

(3) Other equipment equal or greater in efficiency to those devices listed above, and approved by the Department.

c. After January 1, 1974, a person shall not cause or permit organic material with a true vapor pressure of 1.5 psi or greater to be loaded into any tank truck, tank trailer or other contrivance from any existing loading system on any premise at which the total daily throughput (1/300 of actual annual throughput) exceeds 40,000 gallons or from any new loading system on any premise at which the total daily throughput exceeds 20,000 gallons unless the loading system is equipped with a vapor recovery system that is properly installed, well-maintained and in operation and has been approved by the Department. Additions to, or modifications or alterations of existing loading systems which increase the total daily throughput at a premise to more than 40,000 gallons shall require such a vapor recovery system for the entire loading system. All loading connections on the vapor lines shall be equipped with fittings which shall be vapor tight and will automatically and immediately close upon disconnection so as to prevent release of organic material from these fittings. The provisions of this paragraph shall not apply to the loading of motor vehicle fuel tanks.

d. After January 1, 1974, a person shall not cause or permit any motor vehicle fuel with a true vapor pressure of 1.5 psi or greater to be loaded from a tank truck or trailer or other contrivance into a stationary tank having a capacity greater than 5,000 gallons, but less than 40,000 gallons and installed after January 1, 1973, unless the loading system is equipped with a vapor balance line or equally effective vapor discharge control system approved by the Department. Components of the vapor balance line consisting of a vapor space connection on the tank and a compatible vapor return line on the truck shall be installed by the following dates:

| | |
|---|---|
| Tank connection | January 1, 1973 |
| Truck vapor return line | January 1, 1974 |

e. Motor Vehicle Fuel.

(1) After May 31, 1975, a person shall not cause or permit any motor vehicle fuel with a true vapor pressure of 1.5 psi or greater to be loaded into an existing stationary tank having a capacity of less than 40,000 gallons unless the loading system is equipped with a vapor balance line or equally effective vapor discharge control system approved by the Department at a premise where the monthly average throughput (1/12 of the sum total throughput for the preceeding twelve months) exceeds 50,000 gallons per month. The owner or operator of any premise subject to these requirements shall submit to the Department by January 2, 1974, the following information:

Location of premise
Sum total throughput for the preceeding twelve months
Schedule for:
Negotiation of construction contract
Start of construction
Completion of construction

(2) After May 31, 1977, a person shall not cause or permit any motor vehicle fuel with a true vapor pressure of 1.5 psi or greater to be loaded into an existing stationary tank having a capacity of less than 40,000 gallons unless the loading system is equipped with a vapor balance line or equally effective vapor discharge control system capable of a minimum of 90 percent control of the emission approved by the Department at a premise where the monthly average throughput exceeds 20,000 gallons per month.

(3) A person shall not cause or permit any motor vehicle fuel tank to be filled with motor vehicle fuel with a true vapor pressure of 1.5 psi or greater from a premise where stationary tanks are equipped with vapor balance lines, unless a vapor collecting system, approved by the Department, is installed and in good operating condition. This part shall become effective 18 months after the Department has approved two or more such vapor collection systems.

(3) Organic Solvents.

a. A person shall not cause or permit the discharge of any emissions of organic materials in any one day from any installation or building, erected on or after May 12, 1972, in which any organic solvent or solvent containing material is in direct contact with a flame, or is baked, heat cured, or heat polymerized in the presence of oxygen in excess of 15 pounds per day unless the discharge is reduced by 85 percent or more overall. The corresponding limit for such installations erected before May 12, 1972, shall be 200 pounds per day unless reduced by 85 percent or more overall.

b. A person shall not cause or permit the discharge of any emissions of photochemically reactive solvent in any one day from any installation or building erected on or after May 12, 1972, not specifically defined in paragraph (3)a above, used for employing, apply, evaporating, drying, processing or manufacturing any such solvent or material containing such solvent, in excess of 40 pounds per day unless the discharge is reduced by 85 percent or more overall. The corresponding limit for installations erected before May 12, 1972, shall be 200 pounds per day unless reduced by 85 percent or more overall. Exceptions to this provision shall include the operating of tar heaters, coke ovens and air ventilating systems evacuating spaces in which the solvent concentration is lower than the TLV for human exposure as defined by the American Conference of Governmental Industrial Hygienists.

c. A person incinerating, adsorbing or otherwise processing organic materials pursuant to this rule shall provide, properly install and maintain in calibration, in good working order and in operation devices as specified in the authority to construct or the permit to operate, or as specified by the Department for indicating temperatures, pressures, rates of flow or other operating conditions necessary to determine the degree and effectiveness of air pollution control.

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Maryland State Department of Health and Mental Hygiene
201 West Preston Street
Baltimore, Maryland 21201

(As Amended through June 17, 1975)

## 10.03.39 Regulations Governing the Control of Air Pollution in Area IV*

Pursuant to the authority conferred upon the Secretary of Health and Mental Hygiene by Article 43, Section 697, Annotated Code of Maryland, 1957 Edition, and Supplement, the following regulations governing the control of air pollution in Area IV are hereby established as requirements of the Department of Health and Mental Hygiene.

### .01 CONTROL AND PROHIBITION OF OPEN FIRES

A. General. A person shall not cause or permit an open fire except as provided in subsections .01B, .01C, and .01D.

B. Control Officer May Authorize Certain Open Fires. The Control Officer may, upon receipt of an application made on forms provided by the Department or local fire control agency, issue or approve a permit in writing allowing an open fire provided all of the following conditions are met:

(1) The Control Officer is satisfied that there is no practical alternate method to dispose of the material to be burned or to conduct the desired activity.
(2) A hazardous condition or air pollution or nuisance will not be created.
(3) Burning shall not be done within 500 yards of one or more occupied buildings or a heavily travelled public roadway.
(4) Fire control laws or regulations of other governmental agencies will not be violated.
(5) Materials will not be burned which produce dense smoke when burned, including but not limited to tires and roofing material.
(6) Such other conditions as the Control Officer may impose to minimize creation of smoke, to prevent nuisances and air pollution, and to protect the health, safety, comfort, and property of any persons shall be satisfied.
(7) The material to be burned shall have originated on the premises on which it is to be burned.
(8) Exceptions. Methods of disposal by burning acceptable to the Department may be approved for use when distance limitations cannot be met.

C. Public Officers May Authorize Certain Fires. Public officers, in the performance of their official duties, may set an open fire or give permission for an open fire, with concurrence of the Control Officer, provided all reasonable means are employed to minimize smoke and if the fire is necessary for one or more of the following reasons or purposes:

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*Washington Metropolitan Area comprising Montgomery and Prince George's Counties.

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J. Hydrocarbons from Other than Fuel Burning Equipment.

(1) Definitions for purposes of these regulations:

a. "Architectural Coating" shall mean any coating used for residential, commercial or industrial buildings and their appurtenances.

b. "Motor Vehicle Fuel" shall mean motor vehicle fuel as defined in Article 56, Section 135(b) of the Annotated Code of Maryland.

c. "Organic Material" shall mean chemical compounds of carbon excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbonates, metallic carbides and ammonium carbonates.

d. "Organic Solvent" shall mean any organic material which is liquid at standard conditions and which is used as a dissolver, viscosity reducer or cleaning agent.

e. "Photochemically Reactive Organic Solvent" shall mean any organic solvent with an aggregate of more than 20% of its total volume composed of the chemical compounds classified below or which exceeds any of the following individual percentage composition limitations referred to the total volume of solvent:

(1) A combination of hydrocarbons, alcohols, aldehydes, esters or ketones any of which has an olefinic or cyclo-olefinic types of unsaturation: 5%.

(2) A combination of aromatic compounds with eight or more carbon atoms to the molecule except ethylbenzene: 8%.

(3) A combination of ethylbenzene, ketones having branched hydrocarbon structures or toluene: 20%.

Whenever any organic solvent or any constituent of an organic solvent may be classified from its chemical structure into more than one of the above groups of organic compounds, it shall be considered as a member of the most reactive chemical group, that is, that group having the least allowable percent of the total volume of solvents.

For architectural coatings only, the volume of water contained in the solvent may be used to compute the total volume of the solvent in determining percentages of photochemically reactive organic solvents.

f. "Reid Vapor Pressure" shall mean the absolute pressure in pounds per square inch determined at 100°F and V/L = 4 (ratio of vapor volume to liquid volume, as defined in ASTM designation D 323-58) by using apparatus and procedures as standardized under the auspices of the American Society for Testing and Materials.

g. "True Vapor Pressure" shall mean the absolute pressure in pounds per square inch determined at storage conditions. Storage conditions shall be taken as the average monthly temperature. If the storage is subject to solar and ambient heat gain only, the temperature shall be taken as the average monthly temperature to a maximum average of 78°F (average storage temperature for May through September). True vapor pressure shall be determined by measurement at the storage conditions or by the use of a nomograph, published by the Coordinating Research Council and included with these regulations as Figure 1, relating true vapor pressure to Reid vapor pressure and storage temperature.

h. "Vapor Balance Line" shall mean any connection closed to the atmosphere between the vapor space of two storage containers that will allow the vapors to be displaced as the liquid is transferred from one tank to the other.

i. "Photochemically Reactive Organic Materials" shall include any of the following:

(1) Hydrocarbons, alcohols, aldehydes, esters or ketones any of which has an olefinic or cyclo-olefinic type unsaturation,

(2) Aromatic compounds with 7 or more carbon atoms,

(3) Ketones having branched hydrocarbon structure,

(4) Motor vehicle fuel with a true vapor pressure greater than 1.5 psia at 78°F,

(5) Organic solvents which have been in direct contact with flame in the presence of oxygen,

(6) Compounds emitted from a process in which organic solvents are baked, heat cured or heat polymerized in the presence of oxygen.

(2) Organic Material.

a. After January 1, 1973, a person shall not cause or permit organic material having a true vapor pressure in the range of 1.5 to 11 psi inclusive to be placed, stored or held in any existing stationary tank reservior with a capacity of greater than 65,000 gallons, or in any new stationary tank reservior with a capacity of greater than 40,000 gallons unless the tank is equipped with one or more of the following organic material vapor control devices, properly installed, well-maintained and in operating condition.

(1) A floating roof resting on the surface of the liquid contents equipped with a closure seal, or seals, to close the space between the roof edge and tank wall, and in addition, all tank gauging and sampling devices shall be gas-tight except when in use, or

(2) A pressure tank system maintaining a pressure at all times so as to prevent organic material loss to the atmosphere, or

(3) A vapor recovery system capable of collecting the organic materials emitted from the tank and disposing of these emissions so as to prevent their emission to the atmosphere, and in addition, all tank gauging and sampling devices shall be gas-tight except when in use, or

(4) Other equipment equal or greater in efficiency to those devices listed above, and approved by the Department.

b. After January 1, 1973, a person shall not cause or permit organic materials having a true vapor pressure greater than 11 psi to be placed, stored or held in any existing stationary tank reservior with a capacity of greater than 65,000 gallons, or in any new stationary tank reservior with a capacity greater than 40,000 gallons unless equipped with one of the following organic material vapor control devices properly installed, well-maintained and in operating condition:

(1) A pressure tank system maintaining a pressure at all times so as to prevent organic material loss to the atmosphere, or

(2) A vapor recovery system capable of collecting the organic materials emitted from the tank and disposing of these emissions so as to prevent their emission to the atmosphere, and in addition, all tank gauging and sampling devices shall be gas-tight except when in use, or

(3) Other equipment equal or greater in efficiency to those devices listed above, and approved by the Department.

c. After January 1, 1974, a person shall not cause or permit organic material with a true vapor pressure of 1.5 psi or greater to be loaded into any tank truck, tank trailer or other contrivance from any existing loading system on any premise at which the total daily throughput (1/300 of actual annual throughput) exceeds 40,000 gallons or from any new loading system on any premise at which the total daily throughput exceeds 20,000 gallons unless the loading system is equipped with a vapor recovery system that is properly installed, well-maintained and in operation and has been approved by the Department. Additions to, or modificiations or alterations of existing loading systems which increase the total daily throughput at a premise to more than 40,000 gallons shall require such a vapor recovery system for the entire loading system. All loading connections on the vapor lines shall be equipped with fittings which shall be vapor tight and will automatically and immediately close upon disconnection so as to prevent release of organic material from these fittings. The provisions of this paragraph shall not apply to the loading of motor vehicle fuel tanks.

d. After January 1, 1974, a person shall not cause or permit any motor vehicle fuel with a true vapor pressure of 1.5 psi or greater to be loaded from a tank truck or trailer or other contrivance into a stationary tank having a capacity greater than 5,000 gallons, but less than 40,000 gallons and installed after January 1, 1973, unless the loading system is equipped with a vapor balance line or equally effective vapor discharge control system approved by the Department. Components of the vapor balance line consisting of a vapor space connection on the tank and a compatible vapor return line on the truck shall be installed by the following dates:

| | |
|---|---|
| Tank connection | January 1, 1973 |
| Truck vapor return line | January 1, 1974 |

e. Motor Vehcile Fuel.

(1) After May 31, 1975, a person shall not cause or permit any motor vehicle fuel with a true vapor pressure of 1.5 psi or greater to be loaded into an existing stationary tank having a capacity of less than 40,000 gallons unless the loading system is equipped with a vapor balance line or equally effective vapor discharge control system approved by the Department at a premise where the monthly average throughput (1/12 of the sum total throughput for the preceeding twelve months) exceeds 50,000 gallons per month. The owner or operator of any premise subject to these requirements shall submit to the Department by January 2, 1974, the following information:

Location of premise
Sum total throughput for the preceeding twelve months
Schedule for:
Negotiation of construction contract
Start of construction
Completion of construction

(2) After May 31, 1977, a person shall not cause or permit any motor vehicle fuel with a true vapor pressure of 1.5 psi or greater to be loaded into an existing stationary tank having a capacity of less than 40,000 gallons unless the loading system is equipped with a vapor balance line or equally effective vapor discharge control system capable of a minimum of 90 percent control of the emission approved by the Department at a premise where the monthly average throughput exceeds 20,000 gallons per month.

(3) A person shall not cause or permit any motor vehicle fuel tank to be filled with motor vehicle fuel with a true vapor pressure of 1.5 psi or greater from a premise where stationary tanks are equipped with vapor balance lines, unless a vapor collecting system, approved by the Department, is installed and in good operating condition. This part shall become effective 18 months after the Department has approved two or more such vapor collection systems.

(3) Organic Solvents.

a. A person shall not cause or permit the discharge of any emissions of organic materials in any one day from any installation or building, erected on or after May 12, 1972, in which any organic solvent or solvent containing material is in direct contact with a flame, or is baked, heat-cured, or heat polymerized in the presence of oxygen in excess of 15 pounds per day unless the discharge is reduced by 85 percent or more overall. The corresponding limit for such installations erected before May 12, 1972, shall be 200 pounds per day unless reduced by 85 percent or more overall.

b. A person shall not cause or permit the discharge of any emissions of photochemically reactive solvent in any one day from any installation or building erected on or after May 12, 1972, not specifically defined in paragraph (3)a above, used for employing, applying, evaporating, drying, processing or manufacturing any such solvent or material containing such solvent, in excess of 40 pounds per day unless the discharge is reduced by 85 percent or more overall. The corresponding limit for installations erected before May 12, 1972, shall be 200 pounds per day unless reduced by 85 percent or more overall. Exceptions to this provision shall include the operation of tar heaters, coke ovens and air ventilating systems evacuating spaces in which the solvent concentration is lower than the TLV for human exposure as defined by the American Conference of Governmental Industrial Hygienists.

c. A person incinerating, adsorbing or otherwise processing organic materials pursuant to this rule shall provide, properly install and maintain in calibration, in good working order and in operation devices as specified in the authority to construct or the permit to operate, or as specified by the Department for indicating temperatures, pressures, rates of flow or other operating conditions necessary to determine the degree and effectiveness of air pollution control.

March 1, 1974, each submit to the Administrator a compliance schedule which shall be subject to the Administrator's approval and which shall include, at a minimum, copies of all relevant sources of authority for the program of traffic flow improvements, a signed statement by the Governor of Maryland, the Mayor of Baltimore or their designees, identifying the sources of funding for the program, and a complete list of specific projects and their estimated initiation and completion dates. All projects necessary to the pollution reduction benefits claimed in the State plan must be completed by May 31, 1977. On or before May 1, 1974, the State of Maryland and the City of Baltimore shall submit to the Administrator legally adopted regulations providing for completion of the projects in accordance with the compliance schedule.

(2) The State of Maryland and the City of Baltimore shall in the compliance schedule required pursuant to this paragraph, indicate for each project in the traffic management program the increase anticipated in average annual daily traffic volume within twenty years of project completion on the road or highway in question because of the project. No project shall be approved by the Administrator if the air pollution benefits in terms of speeding traffic flow will be negated by increased traffic volume.

### § 52.1081 Control strategy: Carbon monoxide and photochemical oxidants (hydrocarbons).

(a) With respect to the transportation control plan for the National Capital region submitted by the State, the requirements of § 51.14(a) (1) and (2) of this Chapter are not met because there are no proposed regulations, nor an adequate description of enforcement and administrative procedures for the strategies for express bus lanes, increased bus fleet and service, elimination of free on-street commuter parking, and elimination of free parking by employers.

(b) The requirements of § 51.14(c) of this chapter are not met with respect to the transportation control plans for the National Capital region because the strategies were not defined well enough to insure the claimed and required emission reductions. Inadequate technical justification was provided for the claimed reductions in aircraft emissions and no strategies were provided for these reductions.

(c) With respect to the transportation control plan for the Metropolitan Baltimore Intrastate Region submitted by the State on April 16, June 15, June 28, and July 9, 1973, the requirements of § 51.14(a) (3) (i) and (ii) of this chapter are not met because there are no proposed regulations, nor an adequate description of enforcement and administrative procedures for the carpool locator program approved in § 52.1073(d). To cure these deficiencies and the deficiencies set out in §52.1074(a), a carpool locator regulation is promulgated in § 52.1104. The requirements of §51.14(a) (3) (i) of this chapter are also not met, in whole or in part, for inspection/maintenance, heavy duty retrofit, and restricted vehicle use during predicted stagnations referred to in § 52.1073(e), and the traffic flow improvement program referred to § 52.1073(d).

(d) The requirements of § 51.14(c) of this chapter are not met with respect to the restrictions on vehicle use during predicted stagnations disapproved in § 52.1073(e). Maryland has not demonstrated the availability of a reliable method or system for predicting air episodes. The requirements of § 51.14(c) of this chapter are also not met with respect to gasoline vapor controls to the extent that Maryland proposes to exempt stations with a throughput of less than 20,000 gallons/month.

[41 FR 26901, June 30, 1976]

### § 52.1082 Rules and regulations.

(a) The requirements of § 51.22 of this chapter are not met for the National Capital Interstate Region because regulations necessary to implement proposed stationary control measures for gas handling and dry cleaning losses have not been adopted. Substitute regulations are promulgated in §§ 52.1086, 52.1087, and 52.1088.

(b) The requirements of § 51.22 of this chapter are not met for the Metropolitan Baltimore Intrastate Region because adopted regulations to implement proposed stationary control measures referred to in § 52.1073(d) establishing an "emission freeze" were not submitted, and adopted regulations to control gas handling and dry cleaning emissions, measures referred to in § 52.1073(d), were not submitted in time to be approved prior to this promulgation. Substitute regulations for gas handling and dry cleaning emissions are promulgated in §§ 52.1101, 52.1102, and 52.1107. The gasoline vapor recovery regulations as promulgated specify a 90 percent reduction in emissions, thus curing the defect noted in paragraph (d) of § 52.1081. A substitute regulation for the emission freeze is promulgated in § 52.1112.

### § 52.1083 Resources.

The requirements of § 51.20 of this chapter are not met for the Metropolitan Baltimore intrastate region or the Maryland portion of the National Capital interstate region because the plan does not include a discussion of the adequacy of existing State resources and does not say whether any additional State resources, including projections for 5 years, will be required to carry out any of the proposed transportation control measures.

### § 52.1084 Intergovernmental cooperation.

(a) The requirements of § 51.21 of this chapter are not met because local agencies and their responsibilities in carrying out transportation control measures are not adequately identified.

### § 52.1085

[Reserved, 40 FR 16845, April 15, 1975]

### § 52.1086 Gasoline transfer vapor control.

(a) "Gasoline" means any petroleum distillate having a Reid vapor pressure of 4 pounds or greater.

(b) This section is applicable in the Maryland portion of the National Capital Interstate AQCR.

(c) No person shall transfer gasoline from any delivery vessel into any stationary storage container with a capacity greater than 250 gallons unless the displaced vapors from the storage container are processed by a system that prevents release to the atmosphere of no less than 90 percent by weight of organic compounds in said vapors displaced from the stationary container location.

(1) The vapor recovery portion of the system shall include one or more of the following:

(i) A vapor-tight return line from the storage container to the delivery vessel and a system that will ensure that the vapor return line is connected before gasoline can be transferred into the container.

(ii) Refrigeration-condensation sys-

**tem or equivalent designed to recover no less than 90 percent by weight of the organic compounds in the displaced vapor.**

**(2) If a "vapor-tight vapor return" system is used to meet the requirements of this section, the system shall be so constructed as to be readily adapted to retrofit with an adsorption system, refrigeration-condensation system, or equivalent vapor removal system, and so constructed as to anticipate compliance with § 52.1087 of this chapter.**

**(3) The vapor-laden delivery vessel shall be subject to the following conditions:**

**(i) The delivery vessel must be so designed and maintained as to be vapor-tight at all times.**

**(ii) The vapor-laden delivery vessel may be refilled only at facilities equipped with a vapor recovery system or the equivalent, which can recover at least 90 percent by weight of the organic compounds in the vapors displaced from the delivery vessel during refilling.**

**(iii) Gasoline storage compartments of 1,000 gallons or less in gasoline delivery vehicles presently in use on the promulgation date of this regulation will not be required to be retrofitted with a vapor return system until January 1, 1977.**

**(d) The provisions of paragraph (c) of this section shall not apply to the following:**

**(1) Stationary containers having a capacity less than 550 gallons used exclusively for the fueling of implements of husbandry.**

**(2) Any container having a capacity less than 2,000 gallons installed prior to promulgation of this section.**

**(3) Transfers made to storage tanks equipped with floating roofs or their equivalent.**

**(4) Any stationary container at any facility where the monthly average throughput ($\frac{1}{12}$ of the total throughput for the preceeding twelve months) exceeds 20,000 gallons per month and which is subject to Maryland regulation 10.03.39.04J(2) (e) (1) and (2).**

[41 FR 26901, June 30, 1976]

**(e) Every owner or operator of a stationary storage container or delivery vessel subject to this section shall comply with the following compliance schedule:**

(1) June 1, 1974–Submit to the Administrator **a final control plan, which describes at a minimum the steps which will be taken by the source to achieve compliance with the provisions of paragraph (c) of this section.**

[39 FR 4880, February 8, 1974]

(2) March 1, 1975 – Negotiate and sign all necessary contracts for emission control systems, or issue orders for the purchase of component parts to accomplish emission control.

[39 FR 4880, February 8, 1974; 39 FR 41252, November 26, 1974]

(3) May 1, 1975 – Initiate on-site construction or installation of emission control equipment.

[39 FR 41252, November 26, 1974]

**(4) February 1, 1976—Complete on-site construction or installation of emission control equipment.**

**(5) May 31, 1977. Assure final compliance with the provisions of paragraph (c) of this section.**

**(6) Any owner or operator of sources subject to the compliance schedule in this paragraph shall certify to the Administrator, within 5 days after the deadline for each increment of progress, whether or not the required increment of progress has been met.**

**(f) Paragraph (e) of this section shall not apply:**

**(1) To a source which is presently in compliance with the provisions of paragraph (c) of this section and which has certified such compliance to the Admin**istrator by June 1, 1974. The Administrator may request whatever supporting information he considers necessary for proper certification.

[39 FR 4880, February 8, 1974]

**(2) To a source for which a compliance schedule is adopted by the State and approved by the Administrator.**

**(3) To a source whose owner or operator** submits to the Administrator, by June

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1, 1974, a proposed alternative schedule. No such schedule may provide for compliance after March 1, 1976. Any such schedule shall provide for certification to the Administrator, within 5 days after the deadline for each increment therein, as to whether or not that increment has been met. If promulgated by the Administrator, such schedule shall satisfy the requirements of this paragraph for the affected source.

[39 FR 4880, February 8, 1974]

(g) Nothing in this section shall preclude the Administrator from promulgating a separate schedule for any source to which the application of the compliance schedule in paragraph (e) of this section fails to satisfy the requirements of § 51.15 (b) and (c) of this chapter.

(h) Any gasoline dispensing facility subject to this section which installs a storage tank after the effective date of this section shall comply with the requirements of paragraph (c) of this section by May 31, 1977, and prior to that date shall comply with paragraph (e) of this section as far as possible. Any facility subject to this section which installs a storage tank after May 31, 1977, shall comply with the requirements of paragraph (c) of this section at the time of installation.

[41 FR 26901, June 30, 1976]

### § 52.1087 Control of evaporative losses from the filling of vehicular tanks.

(a) "Gasoline" means any petroleum distillate having a Reid vapor pressure of 4 pounds or greater.

(b) This section is applicable in the Maryland portion of the National Capital Interstate AQCR.

(c) A person shall not transfer gasoline to an automotive fuel tank from a gasoline dispensing system unless the transfer is made through a fill nozzle designed to:

(1) Prevent discharge of hydrocarbon vapors to the atmosphere from either the vehicle filler neck or dispensing nozzle;

(2) Direct vapor displaced from the automotive fuel tank to a system wherein at least 90 percent by weight of the organic compounds in displaced vapors are recovered; and

(3) Prevent automotive fuel tank overfills or spillage on fill nozzle disconnect.

(d) The system referred to in paragraph (c) of this section may consist of a vapor-tight return line from the fill nozzle-filler neck interface to the dispensing tank or to an adsorption, absorption, incineration, refrigeration-condensation system or its equivalent.

(e) Components of the systems required by § 52.1086 may be used for compliance with paragraph (c) of this section.

(f) If it is demonstrated to the satisfaction of the Administrator that it is impractical to comply with the provisions of paragraph (c) of this section as a result of vehicle fill neck configuration, location, or other design features of a class of vehicles, the provisions of this section shall not apply to such vehicles. However, in no case shall such configuration exempt any gasoline dispensing facility from installing and using in the most effective manner a system required by paragraph (c) of this section.

(g) Every owner or operator of a gasoline dispensing system subject to this section shall comply with the following compliance schedule.

(1) January 1, 1975–Submit to the Administrator a final control plan, which describes at a minimum the steps which will be taken by the source to achieve compliance with the provisions of paragraph (c) of this section.

[39 FR 4880, February 8, 1974; 39 FR 21049, June 18, 1974]

[Deferred, 40 FR 1127, January 6, 1975]

(2) March 1, 1975–Negotiate and sign all necessary contracts for emission control systems, or issue orders for the purchase of component parts to accomplish emission control.

[39 FR 4880, February 8, 1974; 39 FR 21049, June 18, 1974]

[Deferred, 40 FR 1127, January 6, 1975]

(3) May 1, 1975–Initiate on-site construction or installation of emission control equipment.

[Deferred, 40 FR 1127, January 6, 1975]

(4) May 1, 1977—Complete on-site construction installation of emission control equipment or process modification.

(5) May 31, 1977—Assure final compliance with the provisions of paragraph (c) of this section.

(6) Any owner or operator of sources subject to the compliance schedule in this paragraph shall certify to the Administrator, within 5 days after the deadline for each increment of progress, whether or not the required increment of progress has been met.

(h) Paragraph (g) of this section shall not apply:

(1) To a source which is presently in compliance with the provisions of paragraph (c) of this section and which has certified such compliance to the Administrator by January 1, 1975. The Administrator may request whatever supporting information he considers necessary for proper certification.

[39 FR 4880, February 8, 1974; 39 FR 21049, June 18, 1974]

(2) To a source for which a compliance schedule is adopted by the State and approved by the Administrator.

(3) To a source whose owner or operator submits to the Administrator, by June 1, 1974, a proposed alternative schedule. No such schedule may provide for compliance after May 31, 1977. Any such schedule shall provide for certification to the Administrator, within 5 days after the deadline for each increment therein, as to whether or not that increment has been met. If promulgated by the Administrator, such schedule shall satisfy the requirements of this paragraph for the affected source.

[39 FR 4880, February 8, 1974]

(i) Nothing in this section shall preclude the Administrator from promulgating a separate schedule for any source to which the application of the compliance schedule in paragraph (g) of this section fails to satisfy the requirements of § 51.15 (b) and (c) of this chapter.

(j) Any gasoline dispensing facility subject to this section which installs a gasoline dispensing system after the effective date of this section shall comply with the requirements of paragraph (c) of this section by May 31, 1977, and prior to that date shall comply with paragraph (g) of this section as far as possible. Any facility subject to this section which installs a gasoline dispensing system after May 31, 1977, shall comply with the requirements of paragraph (c) of this section at the time of installation.

### § 52.1088 Control of dry cleaning solvent evaporation.

(a) Definitions:

(1) "Dry cleaning operation" means that process by which an organic solvent is used in the commercial cleaning of garments and other fabric materials.

(2) "Organic solvents" means organic materials, including diluents and thinners, which are liquids at standard conditions and which are used as dissolvers, viscosity reducers, or cleaning agents.

(3) "Photochemically reactive solvent" means any solvent with an aggregate of more than 20 percent of its total volume composed of the chemical compounds classified below or which exceeds any of the following individual percentage composition limitations, as applied to the total volume of solvent.

(i) A combination of hydrocarbons,

periodic inspection and maintenance of vehicles) for emissions testing at the time of device installation or some other positive assurance that the device is installed and operating correctly.

(e) After May 31, 1977, the State shall not register or allow to operate on its streets or highways any vehicle that does not comply with the applicable standards and procedures adopted pursuant to paragraph (d) of this section.

(f) After May 31, 1977, no owner of a vehicle subject to this section shall operate or allow the operation of any such vehicle that does not comply with the applicable standards and procedures implementing this section.

(g) The State may exempt any class or category of vehicles from this section which the State finds is rarely used on public streets and highways (such as classic or antique vehicles) or for which the State demonstrates to the Administrator that air/fuel control retrofits or other devices approved pursuant to this section are not commercially available.

## § 52.1101 Gasoline transfer vapor control.

(a) Definitions:

(1) "Gasoline" means any petroleum distillate having a Reid vapor pressure of 4 pounds or greater.

**(b) This section is applicable in the Metropolitan Baltimore Intrastate AQCR.**

(c) No person shall transfer gasoline from any delivery vessel into any stationary storage container with a capacity greater than 250 gallons unless the displaced vapors from the storage container are processed by a system that prevents release to the atmosphere of no less than 90 percent by weight of organic compounds in said vapors displaced from the stationary container location.

(1) The vapor recovery portion of the system shall include one or more of the following:

(i) A vapor-tight return line from the storage container to the delivery vessel and a system that will ensure that the vapor return line is connected before gasoline can be transferred into the container.

(ii) Refrigeration - condensation system or equivalent designed to recover no less than 90 percent by weight of the organic compounds in the displaced vapor.

(2) If a "vapor-tight vapor return" system is used to meet the requirements of this section, the system shall be so constructed as to be readily adapted to retrofit with an adsorption system, refrigeration-condensation system, or equivalent vapor removal system, and so constructed as to anticipate compliance with § 52.1102 of this subpart.

(3) The vapor-laden delivery vessel shall be subject to the following conditions:

(i) The delivery vessel must be so designed and maintained as to be vapor-tight at all times.

(ii) The vapor-laden delivery vessel may be refilled only at facilities equipped with a vapor recovery system or the equivalent, which can recover at least 90 percent by weight of the organic compounds in the vapors displaced from the delivery vessel during refilling.

(iii) Gasoline storage compartments of 1,000 gallons or less in gasoline delivery vehicles presently in use on the promulgation date of this regulation will not be required to be retrofitted with a vapor return system until January 1, 1977.

(d) The provisions of paragraph (c) of this section shall not apply to the following:

(1) Stationary containers having a capacity less than 550 gallons used exclusively for the fueling of implements of husbandry.

(2) Any container having a capacity less than 2,000 gallons installed prior to promulgation of this section.

(3) Transfers made to storage tanks equipped with floating roofs or their equivalent

(4) Any stationary container at any facility where the monthly average throughput ($\frac{1}{12}$ of the total throughput for the preceding twelve months) exceeds 20,000 gallons per month and which is subject to Maryland regulation 10.03.38.04J(2)(c) (1) and (2).

[41 FR 26901, June 30, 1976]

(e) Every owner or operator of a stationary storage container or delivery vessel subject to this section shall comply with the following compliance schedule:

(1) *June 1, 1974.* Submit to the Administrator a final control plan, which describes at a minimum the steps which will be taken by the source to achieve compliance with the provisions of paragraph (c) of this section.

[39 FR 4880, February 8, 1974]

(2) *March 1, 1975.* Negotiate and sign all necessary contracts for emission control systems, or issue orders for the purchase of component parts to accomplish emission control.

[39 FR 4880, February 8, 1974; 39 FR 41252, November 26, 1974]

(3) *May 1, 1975.* Initiate on-site construction or installation of emission control equipment.

[39 FR 41252, November 26, 1974]

(4) *February 1, 1976.* Complete on-site construction or installation of emission control equipment.

(5) May 31, 1977. Assure final compliance with the provisions of paragraph (c) of this section.

[41 FR 26901, June 30, 1976]

(6) Any owner or operator of sources subject to the compliance schedule in this paragraph shall certify to the Administrator, within 5 days after the deadline for each increment of progress, whether or not the required increment of progress has been met.

(f) Paragraph (e) of this section shall not apply:

(1) To a source which is presently in compliance with the provisions of paragraph (c) of this section and which has certified such compliance to the Administrator by June 1, 1974. The Administrator may request whatever supporting information he considers necessary for proper certification.

[39 FR 4880, February 8, 1974]

(2) To a source for which a compliance schedule is adopted by the State and approved by the Administrator.

(3) To a source whose owner or operator submits to the Administrator, by June 1, 1974, a proposed alternative schedule. No such schedule may provide for compliance after March 1, 1976. Any such schedule shall provide for certification to the Administrator within 5 days after the deadline for each increment therein, as to whether or not that increment has been met. If promulgated by the Administrator, such schedule shall satisfy the requirements of this paragraph for the affected source.

[39 FR 4880, February 8, 1974]

(g) Nothing in this section shall preclude the Administrator from promulgating a separate schedule for any source to which the application of the compliance schedule in paragraph (e) of this section fails to satisfy the requirements of § 51.15(b) and (c) of this chapter.

(h) Any gasoline dispensing facility subject to this section which installs a storage tank after the effective date of this section shall comply with the requirements of paragraph (c) of this section by May 31, 1977, and prior to that date shall comply with paragraph (e) of this section as far as possible. Any facility subject to this section which installs a storage tank after May 31, 1977, shall comply with the requirements of paragraph (c) of this section at the time of installation.

[41 FR 26901, June 30, 1976]

## § 52.1102 Control of evaporative losses from the filling of vehicular tanks.

(a) Definitions:

(1) "Gasoline" means any petroleum

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COMMONWEALTH OF VIRGINIA

# REGULATIONS
FOR THE
# CONTROL AND ABATEMENT
OF
# AIR POLLUTION

THIS BOOKLET CONTAINS ONE OR MORE REVISIONS (AS INDICATED BELOW) TO THE REGULATIONS FOR THE CONTROL AND ABATEMENT OF AIR POLLUTION (DATED: AUGUST 9, 1975). THE REVISION(S) IS DESIGNED TO BE POSTED TO THE BASIC BOOK BY PAGE SUBSTITUTION. WHEN MORE THAN ONE REVISION IS ENCLOSED, THEY SHOULD BE POSTED IN NUMERICAL SEQUENCE TO MAINTAIN BOOK INTEGRITY.

STATE AIR POLLUTION CONTROL BOARD
ROOM 1106, NINTH STREET OFFICE BUILDING
RICHMOND, VIRGINIA 23219

REVISION 3
June 11, 1976

A-33

## 4.52 *HYDROCARBON* EMISSIONS

(a) General

This section shall apply to *stationary sources* in AQCR 7 only.

(b) *Effluent Water Separators*

(1) No *owner* or other *person* shall use any compartment of any single or multiple compartment equipment designed to separate water from *gasoline* or other *photochemically reactive volatile organic compounds* which compartment receives effluent water containing 200 gallons a day or more of *gasoline* or other *photochemically reactive volatile organic compounds* from any equipment processing, refining, treating, storing or handling *gasoline* or other *photochemically reactive volatile organic compounds* unless such compartment is equipped with one of the following vapor loss control devices except when gauging or sampling is taking place:

(i) A solid cover with all openings sealed and totally enclosing the liquid contents of that compartment.

(ii) A floating pontoon or double-deck type cover, equipped with closure seals to enclose any space between the cover's edge and compartment wall.

(iii) A vapor recovery system which reduces the emission of all *organic compound* gases into the atmosphere by at least 90 percent by weight.

(iv) Any system of an efficiency equal to or greater than paragraphs (b)(1)(i), (ii) or (iii) of this section if approved by the *Board*.

(2) Paragraph (b)(1) of this section shall not apply to any *effluent water separator* used exclusively in conjunction with production of crude oil, if the water fraction of the oil-water effluent entering the separator contains less than 5 parts per million hydrogen sulfide, organic sulfides or a combination thereof.

(c) Storage of *Volatile Organic Compounds*

No *owner* or other *person* shall place, store or hold in any stationary tank, reservoir or other container of more than 40,000 gallons capacity any *volatile organic compound*, unless such tank, reservoir or other container is a pressure tank maintaining working pressure sufficient at all times to prevent vapor or gas loss to the atmosphere, or is designed and equipped with one of the following vapor loss control devices, properly installed, in good working order and in operation:

(1) A floating roof, consisting of a pontoon type or double-deck type roof, resting on the surface of the liquid contents and equipped with a closure seal, or seals, to close the space between the roof edge and tank wall. The control equipment provided for in this paragraph shall not be used if the *volatile organic compound* has *vapor pressure* greater than 11.1 pounds per square inch absolute under actual average storage conditions. All tank gauging and sampling devices shall be gastight except when gauging or sampling is taking place.

(2) A vapor recovery or vapor loss control system, which reduces the emission of *organic compounds* into the atmosphere by at least 90 percent by weight. All tank gauging and sampling devices shall be gastight except when gauging or sampling is taking place.

(3) Other equipment of equal efficiency, provided such equipment is approved by the *Board*.

(d) Bulk Loading of *Volatile Organic Compounds*

(1) No *owner* or other *person* shall load *volatile organic compounds* into any tank truck, trailer or railroad tank car from any *loading facility* unless the *loading facility* is equipped with a vapor collection and disposal system or its equivalent approved by the *Board*.

(2) Loading shall be accomplished in such a manner that all displaced vapor and air will be vented only to the vapor collection system. Measures shall be taken to prevent liquid drainage from the loading device when it is not in use or to accomplish substantially complete drainage before the loading device is disconnected.

(3) The vapor disposal portion of the vapor collection and disposal system shall consist of one of the following:

(i) An absorber system or condensation system which processes all vapors and recovers at least 90 percent by weight of the vapors and gases from the equipment being controlled.

(ii) A vapor handling system which directs all vapors to a fuel gas system.

(iii) Any system of an efficiency equal to or greater than paragraphs (d)(3)(i) or (ii) of this section if approved by the *Board*.

(4) Paragraph (d)(1) of this section shall apply only to the loading of *volatile organic compounds* at *loading facilities* from which 20,000 gallons or more of such compounds are loaded per working day, based on a 12-month average.

(e) *Gasoline* Transfer Vapor Control

(1) No *owner* or other *person* shall transfer *gasoline* from any delivery vessel into any stationary storage container with a capacity greater than 2,000 gallons unless such container is equipped with a *submerged fill pipe* and unless the displaced vapors from the storage container are processed by a system that prevents release to the atmosphere of no less than 90 percent by weight of *organic compounds* in said vapors displaced from the stationary container location. The vapor recovery portion of the system shall include one or both of the following:

(i) A vapor-tight vapor return line from the storage container to the delivery vessel which shall be connected before *gasoline* is transferred into the container.

(ii) An absorption system or condensation system or the equivalent which processes and recovers no less than 90 percent by weight of *organic compounds* in the displaced vapor.

(2) The vapor-laden delivery vessel may be refilled only at facilities equipped for 90 percent vapor recovery in accordance with paragraph (d)(3) of this section. The delivery vessel shall be so designed and maintained as to be vapor-tight at all times. For purposes of this sub-paragraph, vapor tight shall mean capable of holding an initial 4 oz (6.9 in$H_2O$) vacuum for 5 minutes without dropping below 2.5 oz (4.3 in$H_2O$).

(3) The provisions of paragraphs (e)(1) and (e)(2) of this section shall not apply to the following:

(i) Facilities whose total average *gasoline* through-put is less than 20,000 gallons per month based on a 12-month average of bulk receipts.

(ii) Stationary storage containers used predominantly for refueling of mobile farm equipment.

(iii) Transfer made to storage tanks equipped with floating roofs or their equivalent.

(4) The provisions of paragraphs (e)(1) and (e)(2) of this section shall be effective on March 1, 1976, except that *gasoline* storage compartments of 1000 gallons or less in *gasoline* delivery vehicles in use on February 3, 1974, will not be required to be retrofitted with a vapor return system until January 1, 1977. *Owners* claiming exemption from this section under paragraph (e)(3)(i) of this section shall submit a record of their monthly bulk receipts to the *Board* for the 12-month periods ending December 31, 1974, December 31, 1975 and thereafter if requested.

(f) Evaporation Losses From the Filling of Vehicular Tanks

(1) No *owner* or other *person* shall transfer *gasoline* to an automotive fuel tank from *gasoline* dispensing systems unless the transfer is made through a fill nozzle designed to:

(i) Prevent discharge to the atmosphere of vapors containing *organic compounds* from either the vehicle filler neck or dispensing nozzle.

(ii) Direct vapor displaced from the automotive fuel tank to a system wherein at least 90 percent by weight of the *organic compounds* in the displaced vapors are recovered.

(iii) Prevent automotive fuel tank overfills or spillage on fill nozzle disconnect.

(2) The system referred to in paragraph (f)(1) of this section may consist of a vapor-tight vapor return line from the fill nozzle filler neck interface to the dispensing tank or to an adsorption, absorption, incineration, refrigeration-condensation system or the equivalent. Components of the systems required by paragraph (e) of this section may be used for compliance with paragraph (f)(1) of this section.

(3) The provisions of paragraph (f)(1) of this section shall not apply to the following:

(i) *Gasoline* transfers to pre-1971 model year automobiles or to other vehicles not required to be equipped with fuel evaporative emission control systems under 40 CFR Part 85.

(ii) Facilities whose total average *gasoline* through-put is less than 20,000 gallons per month, based on a 12-month average of bulk receipts.

(4) The provisions of paragraph (f)(1) of this section shall be effective 18 months after the *Board* has approved such systems as described in paragraph (f)(2) of this section. *Owners* claiming exemption from this section under paragraph (f)(3)(ii) of this section shall submit a record of their monthly bulk receipts to the *Board* for the 12-month period ending January 31, 1976, and January 31, 1977, and thereafter if requested.

(g) Submerged Fill-Storage Vessel

No *owner* or other *person* shall place, store or hold in any stationary storage vessel of more than 2,000 gallons capacity, any *volatile organic compound* unless such vessel is equipped to be filled through a *submerged fill pipe* or is a pressure tank or is fitted with a system as described in paragraph (c) (2) of this section.

(h) Pumps and Compressors

All pumps and compressors handling *volatile organic compounds* shall have mechanical seals or other equipment of equal efficiency for purpose of *air pollution* control as approved by the *Board*.

(i) Waste Gas Disposal

(1) *No owner* or other *person* shall emit a *photochemically reactive organic compound* from any plant producing ethylene for chemical feed stock, or utilizing ethylene as raw material, into the atmosphere in excess of 40 pounds per day unless the waste gas stream is properly burned at 1300°F for 0.3 seconds or greater in a direct-flame afterburner or removed by other methods of comparable efficiency.

(2) No *owner* or other *person* shall emit continuously gases of *photochemically reactive volatile organic compounds* to the atmosphere in excess of 40 pounds per day from a vapor blowdown system unless these gases are burned by smokeless flares, or an equally effective control device as approved by the *Board*. This section is not intended to apply to accidental, emergency or other infrequent emissions of these gases, needed for safe operation of equipment and processes.

(j) *Liquid Organic Compounds*

(1) No *owner* or other *person* shall discharge more than 15 pounds of *organic compounds* into the atmosphere in any one day from any article, machine, equipment or other contrivance in which any *liquid organic compound* comes into contact with flame or is baked, heat-cured or heat-polymerized, in the presence of oxygen unless such a discharge represents an overall reduction of 85 percent or greater.

(2) No *owner* or other *person* shall discharge more than 40 pounds of *organic compounds* into the atmosphere in any one day from any article, machine, equipment or other contrivance used under conditions other than described in paragraph (j)(1) of this section, for employing, applying, evaporating or drying any *photochemically reactive liquid organic compounds*, or material containing such compound, unless all *organic compounds* discharged from such article, machine, equipment or other contrivance have been reduced by at least 85 percent overall. The limitations prescribed in this paragraph shall not apply to any complying industrial surface coating, which means any paint, lacquer, varnish, ink, adhesive or other surface coating material which emits to the atmosphere *organic compounds* which are not photochemically reactive. In determining percentages for waterbase paints, the quantity of water shall be in the calculation of percentage.

(3) Any series of articles, machines, equipment or other contrivances designed for processing a continuously moving sheet, web, strip or wire which is subject to any combination of operations described in paragraph (j)(1) or (j)(2) of this section involving any *photochemically reactive liquid organic compound* or material containing such compound, shall be subject to compliance with paragraph (j)(2) of this section. Where only non-*photochemically reactive liquid organic compounds* are employed or applied, and where any portion or portions of said series of articles, machines, equipment or other con-

trivances involving operations described in paragraph (j)(1) of this section said portions shall be collectively subject to compliance with paragraph (j)(1) of this section.

(4) Emissions of *organic compounds* to the atmosphere from the cleanup with *photochemically reactive liquid organic compounds* of any article, machine, equipment or other contrivances described in paragraph (j)(1), (j)(2) or (j)(3) of this section shall be included with the other emissions of *organic compounds* from that article, machine, equipment or other contrivances for determining compliance with this section.

(5) Emissions of *organic compounds* to the atmosphere as a result of spontaneously continuing the drying of products for the first 12 hours after their removal from any article, machine, equipment or other contrivance described in paragraph (j)(1), (j)(2) or (j)(3) of this section shall be included with other emissions of *organic compounds* from that article, machine, equipment or other contrivance, for determining compliance with this section.

(6) Emissions of *organic compounds* into the atmosphere required to be controlled by paragraph (j)(1), (j)(2) or (j)(3) of this section shall be reduced by:

(i) Incineration, provided that 90 percent or more of the carbon in the *organic compound* being incinerated is oxidized to carbon dioxide, or

(ii) Absorption, or

(iii) Processing in a manner determined by the *Board* to be not less effective than paragraphs (j)(6)(i) or (ii) of this section.

(7) An *owner* incinerating, adsorbing or otherwise processing *organic compounds* pursuant to this section shall provide, properly installed, calibrated, maintained and operated, devices as specified by the *Board*, for indicating temperature, pressure, rate of flow or other operating conditions necessary to determine the degree and effectiveness of *air pollution* control methods.

(8) Any *owner* using *liquid organic compounds* or any materials containing *liquid organic compounds* shall upon request supply the *Board* in the manner and form prescribed by it, written evidence of the chemical compositions, physical properties and amount consumed for each *liquid organic compound* used.

(9) The provision of paragraph (j) of this section shall not apply to:

(i) The transport or storage of *liquid organic compounds* or materials containing *liquid organic compounds*.

(ii) The use of equipment for which other requirements are specified by paragraph (b), (c), (d), (e), (f) or (g) of this section or which are exempt from *air pollution* control requirements by said paragraphs.

(iii) The spraying or application with other equipment of insecticides, pesticides or herbicides.

(iv) The employment, application, evaporation or drying of saturated halogenated *hydrocarbons* or perchlorethylene.

(v) Development or research laboratory operation involving the use of *photochemically reactive liquid organic compounds*.

(vi) The use of any material, in any article, machine, equipment or other contrivance described in paragraph (j)(1), (j)(2), (j)(3) or (j)(4) of this section if:

*a* The volatile content of such material consists only of water and *liquid organic compounds*, and

*b* The *liquid organic compounds* comprise not more than 20 percent of said volatile content, and

*c* The volatile content is not photochemically reactive.

(10) Notwithstanding the above provisions, after May 31, 1974, no *owner* or other *person* shall cause, suffer, allow or permit the use of any *photochemically reactive liquid organic compound* for the purpose of drycleaning of clothing or household items.

| Source | Location | State regulation(s) involved | Date of adoption | Effective date | Final compliance date |
|---|---|---|---|---|---|
| Union Camp Corp. | Franklin | 4.02, 4.03, 4.04 | June 27, 1974 | do | June 30, 1975 |
| U.S. Gypsum Co. | Saltville | 4.04.01(b)(5), 4.04.02, 4.04.01 | June 20, 1974 | do | Apr. 30, 1975 |
| Do. | do | 4.04.01(b)(5), 4.04.02, 4.04.01. | Dec. 11, 1974 | do | June 30, 1975 |
| U.S. Navy Public Works Center | Norfolk | 4.02 | June 27, 1974 | do | Mar. 30, 1975 |
| U.S. Plywood | South Boston | 4.04 | Jan. 9, 1975 | do | June 30, 1975 |
| University of Virginia | Charlottesville | 4.07 | June 26, 1974 | do | Apr. 30, 1975 |
| Vaughn Furniture Co. | Galax | 4.04 | Sept. 5, 1974 | do | May 30, 1975 |
| Vaughn-Bassett Furniture Co. | do | 4.04.01(b)(9) | June 19, 1974 | do | June 30, 1975 |
| Virginia Asphalt Paving Co. | Riverton | 4.02 | Jan. 8, 1975 | do | Apr. 15, 1975 |
| Virginia Foundry Co. | Roanoke | 4.02, 4.04 | June 20, 1974 | do | June 30, 1975 |
| Virginia House Furniture Corp. | Atkins | 4.02, 4.04.01 (b)(9). | Jan. 7, 1975 | do | Apr. 30, 1975 |
| Virginia Lime Co. | Kimballton | Section IV (rules 2, 4). | June 20, 1974 | do | June 30, 1975 |
| Virginia Woodworking Co. | Bristol | 4.03.00, 4.04.01(b). | June 19, 1974 | do | Do. |
| W. S. Frey Co. | Clearbrook | 4.04.01 | June 21, 1974 | do | June 30, 1975 |
| Washington Weaving Co. | Fries | 4.02 | Nov. 7, 1974 | do | Apr. 30, 1975 |
| Weaver Fertilizer Co. | Norfolk | 4.01.02, 4.04.01(a)(1), 4.04.01(b)(3). | June 28, 1974 | do | June 30, 1975 |
| Webb Furniture Co. | Galax | 4.04 | Oct. 30, 1974 | do | Do. |
| Weblite Corp. | Roanoke | 4.04.01(b)(11) | June 27, 1974 | do | Do. |
| Westvaco Corp. (Chemical Plant) | Covington | 4.04, 4.07 | do | do | June 15, 1975 |
| William Byrd Motor Hotel | Richmond | 4.03.01, 4.02.01 | July 1, 1974 | do | June 30, 1975 |
| Wonderknit Corp. | Galax | 4.03 | Oct. 30, 1974 | do | Mar. 15, 1975 |
| Zapata Haynie Corp. | Reedville | 4.04 | June 25, 1974 | do | June 30, 1975 |

[40 FR 33450, August 8, 1975]

### § 52.2436 Rules and regulations.

(a) The requirements of § 51.22 are not met because regulations have not been adopted and submitted for the stationary source measures aimed at reducing gasoline handling and dry cleaning losses. Substitute regulations are promulgated in §§ 52.2438, 52.2439, and 52.2440.

**§ 52.2437** [Reserved, 40 FR 16845, April 8, 1975]

### § 52.2438 Gasoline transfer vapor control.

(a) "Gasoline" means any petroleum distillate having a Reid vapor pressure of 4 pounds or greater.

(b) This section is applicable in the Virginia portion of the National Capital Interstate AQCR.

(c) No person shall transfer gasoline from any delivery vessel into any stationary storage container with a capacity greater than 250 gallons unless the displaced vapors from the storage container are processed by a system that prevents release to the atmosphere of no less than 90 percent by weight of organic compounds in said vapors displaced from the stationary container location.

(1) The vapor recovery portion of the system shall include one or more of the following:

(i) A vapor tight return line from the storage container to the delivery vessel and a system that will ensure that the vapor return line is connected before gasoline can be transferred into the container.

(ii) Refrigeration-condensation system or equivalent designed to recover no less than 90 percent by weight of the organic compounds in the displaced vapor.

(2) If a "vapor-tight vapor return" system is used to meet the requirements of this section, the system shall be so constructed as to be readily adapted to retrofit with an adsorption system, refrigeration-condensation system, or equivalent vapor removal system, and so constructed as to anticipate compliance with § 52.2439.

(3) The vapor-laden delivery vessel shall be subject to the following conditions:

(i) The delivery vessel must be so designed and maintained as to be vapor-tight at all times.

(ii) The vapor-laden delivery vessel may be refilled only at facilities equipped with vapor recovery systems or the equivalent, which can recover at least 90 percent by weight of the organic compounds in the vapors displaced from the delivery vessel during refilling.

(iii) Gasoline storage compartments of one thousand gallons or less in gasoline delivery vehicles presently in use on the promulgation date of this regulation will not be required to be retrofitted with a vapor return system until January 1, 1977.

(d) The provisions of paragraph (c) of this section shall not apply to the following:

(1) Stationary containers having a capacity less than 550 gallons used exclusively for the fueling of implements of husbandry.

(2) Any container having a capacity less than 2,000 gallons installed prior to promulgation of this section.

(3) Transfers made to storage tanks equipped with floating roofs or their equivalent.

(e) Every owner or operator of a stationary storage container or delivery vessel subject to this section shall comply with the following compliance schedule:

(1) June 1, 1974 Submit to the Administrator a final control plan, which describes at a minimum the steps which will be taken by the source to achieve compliance with the provisions of paragraph (c) of this section.

[39 FR 4880, February 8, 1974]

(2) May 1, 1975 – Negotiate and sign all necessary contracts for emission control systems, or issue orders for the purchase of component parts to accomplish emission control.

[39 FR 4880, February 8, 1974; 39 FR 41252, November 26, 1974]

(3) May 1, 1975 – Initiate on-site construction or installation of emission control equipment.

[39 FR 41252, November 26, 1974]

(4) February 1, 1976—Complete on-site construction or installation of emission control equipment.

(5) March 1, 1976—Assure final compliance with the provisions of paragraph (c) of this section.

(6) Any owner or operator of sources subject to the compliance schedule in this paragraph shall certify to the Administrator, within 5 days after the deadline for each increment of progress, whether or not the required increment of progress has been met.

(f) Paragraph (e) of this section shall not apply:

(1) To a source which is presently in compliance with the provisions of paragraph (c) of this section and which has certified such compliance to the Administrator by June 31, 1974. The Administrator may request whatever supporting information he considers necessary for proper certification.

[39 FR 4880, February 8, 1974]

(2) To a source for which a compliance schedule is adopted by the State and approved by the Administrator.

(3) To a source whose owner or operator submits to the Administrator, by June 31, 1974, a proposed alternative schedule. No such schedule may provide for compliance after March 1, 1976. Any such schedule shall provide for certification to the Administrator, within 5 days after the deadline for each increment therein, as to whether or not that increment has been met. If promulgated by the Administrator, such schedule shall satisfy the requirements of this paragraph for the affected source.

[39 FR 4880, February 8, 1974]

(g) Nothing in this section shall preclude the Administrator from promulgating a separate schedule for any source to which the application of the compliance schedule in paragraph (e) of this section fails to satisfy the requirements of § 51.15 (b) and (c) of this chapter.

(h) Any gasoline dispensing facility subject to this section which installs a storage tank after the effective date of this section shall comply with the requirements of paragraph (c) of this section by March 1, 1976, and prior to that date shall comply with paragraph (e) of this section as far as possible. Any facility subject to this section which installs a storage tank after March 1, 1976, shall comply with the requirements of paragraph (c) of this section at the time of installation.

**§ 52.2439 Control of evaporative losses from the filling of vehicular tanks.**

(a) "Gasoline" means any petroleum distillate having a Reid vapor pressure of 4 pounds or greater.

(b) This section is applicable in the Virginia portion of the National Capital Interstate AQCR.

(c) A person shall not transfer gasoline to an automotive fuel tank from a gasoline dispensing system unless the transfer is made through a fill nozzle designed to:

(1) Prevent discharge of hydrocarbon vapors to the atmosphere from either the vehicle filler neck or dispensing nozzle;

(2) Direct vapor displaced from the automotive fuel tank to a system wherein at least 90 percent by weight of the organic compounds in displaced vapors are recovered; and

(3) Prevent automotive fuel tank overfills or spillage on fill nozzle disconnect.

(d) The system referred to in paragraph (c) of this section may consist of a vapor-tight return line from the fill nozzle-filler neck interface to the dispensing tank or to an adsorption, absorption, incineration, refrigeration-condensation system or its equivalent.

(e) Components of the systems required by § 52.2439 may be used for compliance with paragraph (c) of this section.

(f) If it is demonstrated to the satisfaction of the Administrator that it is impractical to comply with the provisions of paragraph (c) of this section as a result of vehicle fill neck configuration, location, or other design features of a class of vehicles, the provisions of this section shall not apply to such vehicles. However, in no case shall such configuration exempt any gasoline dispensing facility from installing and using in the most effective manner a system required by paragraph (c) of this section.

(g) Every owner or operator of a gasoline dispensing system subject to this section shall comply with the following compliance schedule:

(1) June 1, 1974–Submit to the Administrator a final control plan, which describes at a minimum the steps which will be taken by the source to achieve compliance with the provisions of paragraph (c) of this section.

[39 FR 4880, February 8, 1974]

[Deferred, 40 FR 1127, January 6, 1975]

(2) November 1, 1974–Negotiate and sign all necessary contracts for emission control systems, or issue orders for the purchase of component parts to accomplish emission control.

[39 FR 4880, February 8, 1974]

[Deferred, 40 FR 1127, January 6, 1975]

(3) January 1, 1975—Initiate on-site construction or installation of emission control equipment.

[Deferred, 40 FR 1127, January 6, 1975]

(4) May 1, 1977—complete on-site construction installation of emission control equipment or process modification.

(5) May 31, 1977—Assure final compliance with the provisions of paragraph (c) of this section.

(6) Any owner or operator of sources subject to the compliance schedule in this paragraph shall certify to the Administrator, within 5 days after the deadline for each increment of prograss, whether or not the required increment of progress has been met.

(h) Paragraph (g) of this section shall not apply:

(1) To a source which is presently in compliance with the provisions of paragraph (c) of this section and which has certified such compliance to the Administrator by June 31, 1974. The Administrator may request whatever supporting information he considers necessary for proper certification.

[39 FR 4880, February 8, 1974]

(2) To a source for which a compliance schedule is adopted by the State and approved by the Administrator.

(3) To a source whose owner or operator submits to the Administrator, by June 31, 1974, a proposed alternative schedule. No such schedule may provide for compliance after May 31, 1977. Any such

# APPENDIX C

# VAPOR RECOVERY REGULATIONS EFFECTIVE IN HOUSTON/GALVESTON AQCR

# REGULATION V

## CONTROL OF AIR POLLUTION FROM VOLATILE CARBON COMPOUNDS

Rule 501. Regulation V shall apply only in the following counties: Aransas, Bexar, Brazoria, Calhoun, Dallas, El Paso, Galveston, Harris, Jefferson, Matagorda, Montgomery, Nueces, Orange, San Patricio, Travis and Victoria.

Rule 502. Storage of Volatile Carbon Compounds.

502.1 No person shall place, store, or hold in any stationary tank, reservoir, or other container of more than 25,000 gallons capacity any volatile carbon compounds unless such tank, reservoir, or other container is a pressure tank capable of maintaining working pressures sufficient at all times to prevent vapor or gas loss to the atmosphere or is designed and equipped with one of the following vapor loss control devices:

502.11 A floating roof, consisting of a pontoon type, double deck type roof, or internal floating cover, which will rest on the surface of the liquid contents and be equipped with a closure seal or seals to close the space between the roof edge and tank wall. This control equipment shall not be permitted if the volatile carbon compounds have a vapor pressure of 11.0 pounds per square inch absolute or greater under actual storage conditions. All tank gauging and sampling devices shall be gas-tight except when gauging or sampling is taking place.

502.12 A vapor recovery system which reduces the emissions such that the aggregate partial pressure of all volatile carbon compound vapors in vent gases or other material emitted to the atmosphere will not exceed a level of 1.5 psia.

502.2 No person shall place, store, or hold in any new stationary storage vessel of more than 1,000 gallons capacity, any volatile carbon compound unless such vessel is equipped with a permanent submerged fill pipe or is a pressure tank as described in 502.1 or is fitted with a vapor recovery system as described in 502.12.

502.3 Crude oil or condensate storage containers are exempt from Rule 502.

Rule 503. Volatile Carbon Compounds Loading and Unloading Facilities.

503.1 No person shall permit the loading or unloading of volatile carbon compounds from any loading facility having 20,000 gallons or more throughput per day, averaged over any 30-day period, unless such facility is equipped with a vapor recovery system which reduces the emissions such that the aggregate partial pressure of all volatile carbon compound vapors in vent gases or other material emitted to the atmosphere will not exceed a level of 1.5 psia.

When loading or unloading is effected through the hatches of a tank truck or trailer or railroad tank car with a loading arm equipped with a vapor collecting adaptor, then pneumatic, hydraulic, or other mechanical means shall be provided to force a vapor-tight seal between the adaptor and the hatch. A means shall be provided to prevent liquid drainage from the loading device when it is removed from the hatch of any tank truck, trailer or railroad tank car, to accomplish complete drainage before such removal. When loading or unloading is effected through means other than hatches, all loading and vapor lines shall be equipped with fittings which make vapor-tight connections and which close automatically when disconnected or equipped to permit residual volatile carbon compounds in the loading line to discharge into a recovery or disposal system after loading is complete.

503.2 All loading or unloading facilities for crude oil or condensate and for ships and barges are exempt from Rule 503.

Rule 504. Volatile Carbon Compound - Water Separation.

504.1 No person shall use any compartment of any single or multiple compartment volatile carbon compound water separator which compartment receives 200 gallons or more of volatile carbon compounds a day from any equipment which is processing, refining, treating, storing, or handling volatile carbon compounds unless such compartment is controlled in one of the following ways:

504.11 The compartment has all openings sealed and totally encloses the liquid contents. All gauging and sampling devices shall be gas-tight except when gauging or sampling is taking place.

## § 52.2282 Public hearings.

(a) The requirements of § 51.4 of this chapter are not met because principal portions of the revised plan were not made available to the public for inspection and comment prior to the hearing.

## § 52.2283 Control of volatile carbon compounds.

(a) The requirements of Texas Air Control Board Regulation V are incorporated herein by reference and Rule 501 of that Regulation is amended to include (in addition to those counties named therein) Bell, McLennan, Hardin, and Tarrant Counties in Texas.

(b) Except as provided in paragraph (c) of this section, the owner or operator of a source subject to paragraph (a) of this section shall comply with the increments contained in the following compliance schedule.

(1) Contracts for emission control systems or process modifications must be awarded or orders must be issued for the purchase of component parts to accomplish emission control or process modification not later than March 31, 1974.

(2) Initiation of on-site construction or installation of emission control equipment or process change must begin not later than July 31, 1974.

(3) On-site construction or installation of emission control equipment or process modification must be completed not later than March 31, 1975.

(4) Final compliance is to be achieved not later than May 31, 1975.

(5) Any owner or operator of stationary sources subject to the compliance schedule in this paragraph shall certify to the Administrator, within five days after the deadline for each increment of progress, whether or not the required increment of progress has been met.

(c) Paragraph (b) of this section shall not apply:

(1) To a source which is presently in compliance with paragraph (a) of this section and which has certified such compliance to the Administrator by December 1, 1973. The Administrator may request whatever supporting information he considers necessary for proper certification.

(2) To a source for which a compliance schedule is adopted by the State and approved by the Administrator.

(3) To a source whose owner or operator submits to the Administrator, by December 1, 1973 a proposed alternative schedule. No such schedule may provide for compliance after May 31, 1975. If approval is promulgated by the Administrator, such schedule shall satisfy the requirements of this section for the affected source.

(d) Nothing in this section shall preclude the Administrator from promulgating a separate schedule for any source to which the application of the compliance schedule in paragraph (b) of this section fails to satisfy the requirements of § 51.15 (b) and (c) of this chapter.

## § 52.2284 Control of degreasing operations.

(a) Definitions:

(1) "Degreasing" means the operation of using an organic solvent as a surface cleaning agency.

(2) "Organic solvents" include diluents and thinners and are defined as organic materials which are liquid at standard conditions and which are used as dissolvers, viscosity reducers, or cleaning agents.

(3) "Organic material" means a chemical compound of carbon excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides, metallic carbonates, and ammonium carbonate.

(4) "Photochemically reactive solvent" means any solvent with an aggregate of more than 20 percent of its total volume composed of the chemical compounds classified below, or which exceeds any of the following individual percentage composition limitations, as referred to the total volume of solvent.

(i) A combination of hydrocarbons, alcohols, aldehydes, esters, ethers, or ketones having an olefinic or cycloolefinic type of unsaturation: 5 percent.

(ii) A combination of aromatic compounds with 8 or more carbon atoms to the molecule except ethylebenzene: 8 percent.

(iii) A combination of ethylbenzene, ketones having branched hydrocarbon structures, trichloroethylene, or toluence: 20 percent.

(b) This section is applicable in The Houston-Galveston and San Antonio Intrastate Air Quality Control Regions in the State of Texas.

(c) The following are exempt from the requirements of paragraph (d) of this section.

(1) Degreasing operations which emit less than 3 pounds per hour and less than 15 pounds per day of uncontrolled organic materials.

(2) Degreasing operations which use perchloroethylene, 1, 1, 1-tri-chloroethane, or saturated halogenated hydrocarbons as an organic solvent.

(d) No person shall use for degreasing any photochemically reactive solvent unless the uncontrolled organic emissions from such operation are controlled at least 85 percent overall.

(e) Any owner or operator of a degreasing operation who elects to switch use of solvents to one or more of the solvents exempt under paragraph (c)(2) of this section shall specify intent to the Administrator no later than January 1, 1974. Such a solvent switch shall be made no later than May 31, 1974.

(f) Except as provided in paragraph (g) of this section the owner or operator of any degreasing operation subject to the requirements of paragraph (d) of this section shall comply with the following compliance schedule:

(1) January 1, 1974—Submit to the Administrator a final control plan which describes at a minimum, steps which will be taken by the owner or operator to achieve compliance with the requirements of paragraph (d) of this section.

(2) March 1, 1974—Negotiate and sign all necessary contracts for emission control systems or process modifications, or issue orders for the purchase of component parts to accomplish emission control or process modification.

(3) July 1, 1974—Initiate on-site construction or installation of emission control equipment or process modification.

(4) May 1, 1975—Complete on-site construction or installation of emission control equipment or process modification.

(5) May 31, 1975—Achieve final compliance with the requirements of paragraph (d) of this section.

(6) Any owner or operator of a degreasing operation subject to the compliance schedule in this paragraph shall certify to the Administrator within five days after the deadline for each increment of progress, whether or not the required increment of progress has been met.

(g) Paragraph (f) of this section shall not apply to:

(1) A degreasing operation which is presently in compliance with the requirements of paragraph (d) of this section and which has certified such compliance to the Administrator by January 1, 1974. The Administrator may request whatever supporting information he considers necessary for proper certification.

(2) A degreasing operation for which a compliance schedule is adopted by the

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State and approved by the Administrator.

(3) A degreasing operation whose owner or operator submits to the Administrator, by January 1, 1974, a proposed alternative schedule. No such schedule may provide for compliance after May 31, 1975. If promulgated by the Administrator, such schedule shall satisfy the requirements of this section for the affected degreasing operation.

(h) Nothing in this section shall prevent the Administrator from promulgating a separate schedule for any degreasing operation to which the application of the compliance schedule in paragraph (f) of this section fails to satisfy the requirements of § 51.15 (b) and (c) of this chapter.

(i) Any person subject to this regulation who begins a degreasing operation after the effective date of this regulation shall comply with the requirements of paragraphs (c), (d), and (e) of this section. Any degreasing operation subject to this regulation which begins operation after May 31, 1975, shall comply with the requirements of paragraphs (c) and (d) of this section at the time such operation begins.

### § 52.2285 Control of evaporative losses from the filling of storage vessels by 1976.

(a) Definitions:

(1) "Gasoline" means any petroleum distillate having a Reid vapor pressure of four pounds or greater.

(2) "Storage vessel" means any stationary vessel of more than 1,000 gallons (3,800 liters) capacity.

(b) This section is applicable within the Houston-Galveston, Dallas-Fort Worth, and San Antonio Intrastate Air Quality Control Regions in Texas.

(c) No person shall transfer gasoline from any delivery vessel into any stationary storage container with a capacity greater than 1,000 gallons unless such container is equipped with a submerged fill pipe and unless the displaced vapors from the storage container are processed by a system that prevents release to the atmosphere of no less than 90 percent by weight of organic compounds in said vapors displaced from the stationary container location.

(1) The vapor recovery portion of the system shall include one or more of the following:

(i) A vapor-tight return line from the storage container to the delivery vessel and a system that will ensure that the vapor return line is connected before gasoline can be transferred into the container.

(ii) Refrigeration-condensation system or equivalent designed to recover no less than 90 percent by weight of the organic compounds in the displaced vapor.

(2) If a "vapor-tight vapor return" system is used to meet the requirements of this section, the system shall be so constructed as to be readily added on to retrofit with an adsorption system, refrigeration-condensation system, or equivalent vapor removal system, and so constructed as to anticipate compliance with § 52.2288 or § 52.2289.

(3) The vapor-laden delivery vessel shall be subject to the following conditions:

(i) The delivery vessel must be so designed and maintained as to be vapor-tight at all times.

(ii) The vapor-laden delivery vessel may be refilled only at facilities equipped with a vapor recovery system or the equivalent, which can recover at least 90 percent by weight of the organic compounds in the vapors displaced from the delivery vessel during refilling.

(iii) Gasoline storage compartments of one thousand gallons or less in gasoline delivery vehicles presently in use on the promulgation date of this regulation will not be required to be retrofitted with a vapor return system until January 1, 1977.

(d) The provisions of paragraph (c) of this section shall not apply to the following:

(1) Stationary containers used exclusively for the fueling of implements of husbandry.

(2) Any container having a capacity less than 2,000 gallons installed prior to promulgation of this section.

(3) Transfers made to storage tanks equipped with floating roofs or their equivalent.

(e) Except as provided in paragraph (f) of this section, the owner or operator of a source subject to paragraph (c) of this section shall comply with the increments contained in the following compliance schedule:

(1) Contracts for emission control systems or process modifications must be awarded or orders must be issued for the purchase of component parts to accomplish emission control or process modification not later than March 31, 1975.

(2) Initiation of onsite construction or installation of emission control equipment or process change must begin not later than July 1, 1975.

(3) On-site construction or installation of emission control equipment or process modification must be completed not later than March 31, 1976

(4) Final compliance is to be achieved not later than May 31, 1976.

(5) Any owner or operator of stationary sources subject to the compliance schedule in this paragraph shall certify to the Administrator, within five days after the deadline for each increment of progress, whether or not the required increment of progress has been met.

(f) Paragraph (e) of this section shall not apply:

(1) To a source which is presently in compliance with paragraph (c) of this section and which has certified such compliance to the Administrator by June 1, 1974. The Administrator may request whatever supporting information he considers necessary for proper certification.

[39 FR 4880, February 8, 1974]

(2) To a source for which a compliance schedule is adopted by the State and approved by the Administrator.

(3) To a source whose owner or operator submits to the Administrator by June 1, 1974 a proposed alternative schedule. No such schedule may provide for compliance after May 31, 1976. If approval is promulgated by the Administrator, such schedule shall satisfy the requirements of this section for the affected source.

[39 FR 4880, February 8, 1974]

(g) Nothing in this section shall preclude the Administrator from promulgating a separate schedule for any source to which the application of the compliance schedule in paragraph (e) of this section fails to satisfy the requirements of § 51.15(b) and (c) of this chapter.

(h) Any gasoline dispensing facility subject to this regulation which installs a storage tank after the effective date of this regulation shall comply with the requirements of paragraphs (c) and (e) of this section. A facility subject to this regulation which installs a storage tank after May 31, 1976 shall comply with the requirements of paragraph (c) of this section at the time of installation.

### § 52.2286 Control of evaporative losses from the filling of storage vessels by 1975.

(1) "Gasoline" means any petroleum distillate having a Reid vapor pressure of four pounds or greater.

(2) "Storage vessel" means any stationary vessel of more than 1,000 gallons (3,800 liters) capacity.

(b) This section is applicable within the Austin-Waco Intrastate and the Texas portion of the El Paso-Las Cruces-Alamagordo Interstate Air Quality Control Regions in the State of Texas.

(c) No person shall transfer gasoline from any delivery vessel into any stationary storage container with a capacity greater than 1,000 gallons unless such container is equipped with a submerged fill pipe and unless the displaced vapors from the storage container are processed by a system that prevents release to the atmosphere of no less than 90 percent by weight of organic compounds in said vapors displaced from the stationary container location.

(1) The vapor recovery portion of the system shall include one or more of the following:

(i) A vapor-tight return line from the storage container to the delivery vessel and a system that will ensure that the vapor return line is connected before gasoline can be transferred into the container.

(ii) Refrigeration-condensation system or equivalent designed to recover no less than 90 percent by weight of the organic compounds in the displaced vapor.

(2) If a "vapor-tight vapor return" system is used to meet the requirements of this section, the system shall be so constructed as to be readily added on to retrofit with an adsorption system, refrigeration-condensation system, or equivalent vapor removal system, and so constructed as to anticipate compliance with § 52.2288.

(3) The vapor-laden delivery vessel shall be subject to the following conditions:

(i) The delivery vessel must be so designed and maintained as to be vapor-tight at all times.

(ii) The vapor-laden delivery vessel may be refilled only at facilities equipped with a vapor recovery system or the equivalent, which can recover at least 90 percent by weight of the organic compounds in the vapors displaced from the delivery vessel during refilling.

(iii) Gasoline storage compartments of one thousand gallons or less in gasoline delivery vehicles presently in use on the promulgation date of this regulation will not be required to be retrofitted with a vapor return system until January 1, 1976.

(d) The provisions of paragraph (c) of this section shall not apply to the following:

(1) Stationary containers used exclusively for the fueling of implements of husbandry.

(2) Any container having a capacity less than 2,000 gallons installed prior to promulgation of this section.

(3) Transfers made to storage tanks equipped with floating roofs or their equivalent.

(e) Except as provided in paragraph (f) of this section, the owner or operator of a source subject to paragraph (c) of this section shall comply with the increments contained in the following compliance schedule:

(1) Contracts for emission control systems or process modifications must be awarded or orders must be issued for the purchase of component parts to accomplish emission control or process modification not later than July 1, 1974.

[39 FR 4880, February 8, 1974]

(2) Initiation of on-site construction or installation of emission control equipment or process change must begin not later than September 1, 1974.

[39 FR 4880, February 8, 1974]

(3) On-site construction or installation of emission control equipment or process modification must be completed not later than April 30, 1975.

[39 FR 4880, February 8, 1974]

(4) Final compliance is to be achieved not later than May 31, 1975.

(5) Any owner or operator of stationary sources subject to the compliance schedule in this paragraph shall certify to the Administrator, within five days after the deadline for each increment of progress, whether or not the required increment of progress has been met.

(f) Paragraph (e) of this section shall not apply:

(1) To a source which is presently in compliance with paragraph (c) of this section and which has certified such compliance to the Administrator by May 1, 1974. The Administrator may request whatever supporting information he considers necessary for proper certification.

[39 FR 4880, February 8, 1974]

(2) To a source for which a compliance schedule is adopted by the State and approved by the Administrator.

(3) To a source whose owner or operator submits to the Administrator by May 1, 1974, a proposed alternative schedule. No such schedule may provide for compliance after May 31, 1975. If approval is promulgated by the Administrator, such schedule shall satisfy the requirements of this section for the affected source.

[39 FR 4880, February 8, 1974]

(g) Nothing in this section shall preclude the Administrator from promulgating a separate schedule for any source to which the application of the compliance schedule in paragraph (e) of this section fails to satisfy the requirements of § 51.15 (b) and (c) of this chapter.

(h) Any gasoline dispensing facility subject to this regulation which installs a storage tank after the effective date of this regulation shall comply with the requirements of paragraphs (c) and (e) of this section. A facility subject to this regulation which installs a storage tank after May 31, 1975 shall comply with the requirements of paragraph (c) of this section at the time of installation.

### § 52.2287 Ship and barge loading and unloading facilities.

(a) Rule 503.2 of the Texas Air Control Board Regulation V as incorporated by reference on May 31, 1972 (37 FR 10842) is amended to read: "All loading and unloading facilities for crude oil or condensate are exempt from Rule 503." This amendment eliminates an exemption for ships and barges.

(b) This section is applicable to ships and barges which use the port facilities within the Houston-Galveston Intrastate Region.

(c) Except as provided in paragraph (d) of this section, the owner or operator of a source subject to paragraph (a) of this section shall comply with the increments contained in the following compliance schedule.

[Subparagraphs (1) through (3) suspended, 40 FR 18437, April 28, 1975; Subparagraph (4) suspended, 40 FR 24185, June 5, 1975]

(1) Contracts for emission control systems or process modifications not later than March 31, 1974.

(2) Initiation of on-site construction or installation of emission control equipment or process change must begin not later than July 31, 1974.

(3) On-site construction or installation of emission control equipment or process modification must be completed not later than March 31, 1975.

(4) Final compliance is to be achieved not later than May 31, 1975.

(5) Any owner or operator of stationary sources subject to the compliance schedule in this paragraph shall certify to the Administrator, within five days after the deadline for each increment of progress, whether or not the required increment of progress has been met.

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**Environmental Protection Agency, Region VI, 1201 Elm Street, Dallas, Texas 75270.**
**Environmental Protection Agency, Houston Facility, 6608 Hornwood, Houston, Texas 77036.**
**Environmental Protection Agency, Public Information Reference Unit, Room 2922, EPA Library, 401 "M" Street, SW., Washington, D.C. 20460.**
**City of San Antonio, Main Library, Business and Science Department, 203 South St. Marys, San Antonio, Texas 78205.**

In addition, the complete record will be available for public inspection at the Dallas, Texas and Washington, D.C. locations.

This notice of proposed rulemaking is issued under the authority of sections 110(c) and 301(a) of the Clean Air Act (42 U.S.C. 1857c-5(c) and 1857g).

Dated: October 21, 1976.

JOHN C. WHITE,
*Regional Administrator, Region VI, Environmental Protection Agency.*

It is proposed to amend Subpart SS, Texas, of Part 52 of Chapter I, Title 40, of the Code of Federal Regulations as follows:

1. Section 52.2270, paragraph (c), is amended to add item (9) as follows:

### § 52.2270 Identification of Plan.

* * * * *

(c) * * *

(9) Revisions to Texas Air Control Board (TACB) Regulation IV (Control of Air Pollution from Motor Vehicles) were adopted by the TACB on October 30, 1973 and submitted by the Governor on December 11, 1973.

2. Section 52.2272 is revised to read as follows:

### § 52.2272 Extensions.

(a) The Administrator hereby extends the attainment dates for the national standards for photochemical oxidants (hydrocarbons) to May 31, 1977, in the following Air Quality Control Regions as defined in Part 81 of this chapter: Austin-Waco, Corpus Christi-Victoria, Metropolitan Dallas- Fort Worth, Metropolitan Houston-Galveston, Metropolitan San Antonio Intrastate, the Texas portion of the El Paso-Las Cruces-Alamogordo Interstate, and the Texas portion of the Southern Louisiana-Southeast Texas Interstate.

3. Section 52.2275 is revised to read as follows:

### § 52.2275 Control Strategy: Photochemical Oxidants (hydrocarbons).

(a) The requirements of § 51.14(a) of this chapter are not met since the plan submitted by the State does not provide the degree of hydrocarbon emission reduction necessary to attain and maintain the national ambient air quality standard for photochemical oxidants (hydrocarbons) as expeditiously as practicable in the following air quality control regions: Austin-Waco, Corpus Christi-Victoria, Metropolitan Dallas-Fort Worth, Metropolitan Houston-Galveston, and Metropolitan San Antonio Intrastate Regions; the Texas portions of the El Paso-Las Cruces-Alamogordo and Southern Louisiana-Southeast Texas Interstate Regions.

### § 52.2279 [Amended]

4. In § 52.2279, the attainment date table is amended, by revising the last column "Photochemical oxidants (hydrocarbons)" to read as follows with the corresponding first column "Air quality control region";

| Air quality control region | | Photochemical oxidants (hydrocarbons) |
|---|---|---|
| Abilene-Wichita Falls Intrastate. | *** | (a). |
| Amarillo-Lubbock Intrastate | *** | Do. |
| Austin-Waco Intrastate | *** | May 31, 1977. |
| Brownsville-Laredo Intrastate | *** | (a). |
| Corpus Christi-Victoria Intrastate. | *** | May 31, 1977. |
| Midland - Odessa - San Angelo Intrastate. | *** | (a). |
| Metropolitan Houston-Galveston Intrastate. | *** | May 31, 1977. |
| Metropolitan Dallas-Fort Worth Intrastate. | *** | Do. |
| Metropolitan San Antonio Intrastate. | *** | Do. |
| Southern Louisiana-Southesat Texas Interstate. | *** | Do. |
| El Paso - Las Cruces - Alamogordo Interstate. | *** | Do. |
| Shreveport - Texarkana - Tyler Interstate. | *** | (a). |

5. In § 52.2283 paragraphs (a) and (c) are revised to read as follows:

### § 52.2233 Control of volatile carbon compounds.

(a) All requirements of Texas Air Control Board Regulation V (as adopted on April 10, 1973) shall apply in Hardin and Tarrant Counties in Texas. The said Regulation has already been approved as a requirement of the applicable implementation plan for the counties specifically named therein.

* * * * *

(c) Paragraph (b) of this section shall not apply to the owner or operator of:

(1) A source which is presently in compliance with paragraph (a) of this section and which has certified such compliance to the Regional Administrator by December 1, 1973. The Regional Administrator may request whatever supporting information he considers necessary for proper certification.

(2) A source for which a compliance schedule is adopted by the State and approved by the Administrator.

(3) A source whose owner or operator receives approval from the Administrator, by December 1, 1973 of a proposed alternative schedule. No such schedule may provide for compliance after May 31, 1975. If approval is promulgated by the Administrator, such schedule shall satisfy the requirements of this section for the affected source.

* * * * *

6. Section 52.2285 is revised to read as follows:

### § 52.2285 Control of evaporative losses from the filling of gasoline storage vessels in the Houston and San Antonio areas.

(a) *Definitions.* (1) "Gasoline" means any petroleum distillate having a Reid vapor pressure of 4 pounds or greater which is produced for use as a motor fuel and is commonly called gasoline.

(2) "Storage container" means any stationary vessel of more than 1,000 gallons (3,785 liters) capacity. Stationary vessels include portable vessels placed temporarily at a location; e.g., tanks on skids.

(3) "Owner" means the owner of the gasoline storage container(s).

(4) "Operator" means the person who is directly responsible for the operation of the gasoline storage container(s), whether the person be a lessee or an agent of the owner.

(5) "Delivery Vessel" means tank trucks and tank trailers used for the delivery of gasoline.

(6) "Source" means both storage containers and delivery vessels.

(b) This section is applicable to the following counties in Texas: Harris, Galveston, Brazoria, Fort Bend, Waller, Montgomery, Liberty, Chambers, Matagorda, Bexar, Comal, and Guadalupe.

(c) No person shall transfer or permit the transfer of gasoline from any delivery vessel into any stationary storage container with a capacity greater than 1,000 gallons (3.785 liters) unless such container is equipped with a submerged fill pipe and unless the displaced vapors from the storage container are processed by a system that prevents release to the atmosphere of no less than 90 percent by weight of total hydrocarbon compounds in said vapors.

(1) The vapor recovery system shall include one or more of the following:

(i) A vapor-tight line from the storage container to the delivery vessel and a system that will ensure that the vapor return line is connected before gasoline can be transferred into the container.

(ii) Other equipment that prevents release to the atmosphere of no less than 90 percent by weight of the total hydrocarbon compounds in the displaced vapor provided that approval of the proposed design, installation, and operation is obtained from the Regional Administrator prior to start of construction.

(2) The vapor recovery system shall be so constructed that it will be compatible with a vapor recovery system, which may be installed later, to recover vapors displaced by the filling of motor vehicle tanks.

(3) The vapor-laden delivery vessel shall meet the following requirements:

(i) The delivery vessel must be so designed and maintained as to be vapor-tight at all times.

(ii) If any gasoline storage compartment of a vapor-laden delivery vessel is refilled in one of the counties listed in paragraph (b) of this section, it shall be refilled only at a facility which is equip-

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ped with a vapor recovery system, or the equivalent, which prevents release to the atmosphere of at least 90 percent by weight of the total hydrocarbon compounds in the vapor displaced from the delivery vessel during refilling.

(iii) Gasoline storage compartments of one thousand gallons or less in gasoline delivery vessels presently in use on November 6, 1973 will not be required to be retrofitted with a vapor return system until January 1, 1977.

(d) The provisions of paragraph (c) of this section shall not apply to the following:

(1) Storage containers used for the storage of gasoline "used on a farm for farming purposes," as that expression is used in the Internal Revenue Code, 26 U.S.C. 6420.

(2) Any container having a capacity less than 2,000 gallons (7571 liters) installed prior to November 6, 1973.

(3) Transfers made to storage containers equipped with floating roofs or their equivalent.

(e) Except as provided in paragraph (f) of this section, the owner or operator of a source subject to paragraph (c) of this section shall comply with the increments contained in the following compliance schedule:

(1) Contracts for emission control systems or process modifications must be awarded or orders must be issued for the purchase of component parts to accomplish emission control or process modification no later than March 31, 1975.

(2) Initiation of on-site construction or installation of emission control equipment or process change must begin no later than July 1, 1975.

(3) On-site construction or installation of emission control equipment or process modification must be completed no later than June 30, 1976.

(4) Final compliance is to be achieved no later than August 31, 1976.

(5) Any owner or operator of sources subject to the compliance schedule in this paragraph shall certify in writing to the Regional Administrator whether or not the required increment of progress has been met. The certification shall be submitted within five days after the deadlines for each increment. The certification shall include the name(s) and street address(es) of the facility (facilities) for which the certification applies, and the date(s) the increment(s) of progress was (were) met—if met. The Regional Administrator may request whatever supporting information he considers necessary for proper certification.

(f) Paragraph (e) of this section shall not apply to the owner or operator of:

(1) A source which is presently in compliance with paragraph (c) of this section and which has certified such compliance to the Regional Administrator by January 1, 1974. The certification shall include the name(s) and street address(es) of the facility (facilities) for which the certification applies. The Regional Administrator may request whatever supporting information he considers necessary for proper certification.

(2) A source for which a compliance schedule is adopted by the State and approved by the Administrator.

(3) To a source whose owner or operator receives approval from the Administrator by June 1, 1974, of a proposed alternative schedule. No such schedule may provide for compliance after August 31, 1976. If approval is promulgated by the Administrator, such schedule shall satisfy the requirements of this section for the affected source.

(g) Nothing in this section shall preclude the Administrator from promulgating a separate schedule for any source to which the application of the compliance schedule in paragraph (e) of this section fails to satisfy the requirements of § 51.15(b) and (c) of this chapter.

(h) After August 31, 1976 paragraph (c) of this section shall be applicable to every storage container (except those exempted in paragraph (d) of this section) located in the counties specified in paragraph (b) of this section. Every storage container installed after August 31, 1976 shall comply with the requirements of paragraph (c) of this section from the time of installation. In the affected counties, storage containers which were installed, or converted to gasoline storage after November 6, 1973, but before August 31, 1976 shall comply with paragraph (c) of this section in accordance with the schedule established in paragraph (e) of this section.

7. Section 52.2286 is revised to read as follows:

### § 52.2286 Control of evaporative losses from the filling of gasoline storage vessels in the Dallas-Fort Worth area.

(a) *Definitions.* (1) "Gasoline" means any petroleum distillate having a Reid vapor pressure of 4 pounds or greater which is produced for use as a motor fuel and is commonly called gasoline.

(2) "Storage container" means any stationary vessel of more than 1,000 gallons (3,785 liters) capacity. Stationary vessels include portable vessels placed temporarily at a location; e.g., tanks on skids.

(3) "Owner" means the owner of the gasoline storage container(s).

(4) "Operator" means the person who is directly responsible for the operation of the gasoline storage container(s), whether the person be a lessee or an agent of the owner.

(5) "Delivery Vessel" means tank truck and tank trailers used for the delivery of gasoline.

(b) This section is applicable to the following counties in Texas: Dallas, Tarrant, Denton, Wise, Collin, Parker, Rockwall, Kaufman, Hood, Johnson, and Ellis.

(c) No person shall transfer or permit the transfer of gasoline from any delivery vessel into any stationary storage container with a capacity greater than 1,000 gallons (3,785 liters) unless such container is equipped with a submerged fill pipe and unless the displaced vapors from the storage container are processed by a system that prevents release to the atmosphere of not less than 90 percent by weight of total hydrocarbon compounds in said vapors.

(1) The vapor recovery system shall include one or more of the following:

(i) A vapor-tight return line from the storage container to the delivery vessel and a system that will ensure that the vapor return line is connected before gasoline can be transferred into the container.

(ii) Other equipment that prevents release to the atmosphere of no less than 90 percent by weight of the total hydrocarbon compounds in the displaced vapor provided that approval of the proposed design, installation, and operation is obtained from the Regional Administrator prior to start of construction.

(2) The vapor recovery system shall be so constructed that it will be compatible with a vapor recovery system, which may be installed later, to recover vapors displaced by the filling of motor vehicle tanks.

(3) The vapor-laden delivery vessel shall meet the following requirements:

(i) The delivery vessel must be so designed and maintained as to be vapor-tight at all times.

(ii) If any gasoline storage compartment of a vapor-laden delivery vessel is refilled in one of the counties listed in paragraph (b) of this section, it shall be refilled only at facility which is equipped with a vapor recovery system, or the equivalent, which prevents release to the atmosphere of at least 90 percent by weight of the total hydrocarbon compounds in the vapor displaced from the delivery vessel during refilling.

(d) The provisions of paragraph (c) of this section shall not apply to the following:

(1) Storage containers used for the storage of gasoline "used on a farm for farming purposes", as that expression is used in the Internal Revenue Code, 26 U.S.C. 6420.

(2) Any container having a capacity less than 2,000 gallons (7571 liters) installed prior to promulgation of this section.

(3) Transfers made to storage containers equipped with floating roofs or their equivalent.

(e) Except as provided in paragraph (f) of this section, the owner or operator of a source subject to paragraph (c) of this section shall comply with the increments contained in the following compliance schedule:

(1) Contracts for emission control systems or process modifications must be awarded or orders must be issued for the purchase of component parts to accomplish emission control or process modification no later than April 30, 1977.

(2) Initiation of on-site construction or installation of emission control equipment or process modification must begin no later than August 31, 1977.

(3) On-site construction or installation of emission control equipment or process modification must be completed no later than January 31, 1978.

(4) Final compliance is to be achieved no later than March 31, 1978.

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## APPENDIX D

## QUESTIONNAIRE USED IN FIELD SURVEY

# SMALL BULK PLANT EVALUATION

1. Owner Operator ____________________

Address ____________________________

____________________________

Contact ____________________________ Phone (   ) __________

2a. Gasoline throughput ______________________ gallons/month

2b. Grades of gasoline ______________________________________

3a. Other products sold _____________________________________

3b. Percentage of business selling gasoline ___________________

4. Underground tanks - number ______________________________

Capacities ____________________________________________

5. Aboveground tanks - number __________________

Capacities ______________________________

6. Top loading ________________________

Bottom loading _____________________

Submerged fill )____________________

7. Supply vehicles owned by __________________________

Number ________________________________________

Capacity ______________________________________

Frequency of delivery ___________________________

8. Delivery vehicles owned by ______________________________

Number ________

Capacity __________

Time to fill _________

9. Fugitive emissions __________________

11. Vapor Recovery. Delivery Vehicle

Date installed __________ By whom ____________

Cost ______________

Bottom or Top Load ______________

Operating Problems ______________

12. Vapor Recovery Storage Tank/incoming loads

Date installed ___________ By whom ___________

Cost ______________

Operating Problems ______________

13. Vapor Recovery, Storage Tank/Loading Rack (Delivery)

Installed __________ By whom ____________

Installation Cost __________, Operating Cost ______________

Maintenance Cost ____________

Operating Problems _____________

14. Vapor Recovery, Delivery Vehicle

Installed __________ By whom __________

Installation Cost __________ Operating Cost ___________

Maintenance Cost __________

Operating Problems __________

15. % Deliveries to Exempt Customers ________

Type of Exemption: Agricultural_______________

Small Tanks________________ Size _________

Other_______________________

Of Non-exemt customers, what vapor control techniques are being used_______________________________________________________

16. Assume vapor recovery will initially cost $20,000 and operating costs increase 20%.

a) Would you stay in business

b) Could you obtain loan _______ Down payment required _______

c) Comments

Repeat for $10,000__________________$30,000__________________

17. What could you sell your trucks, facility, accounts receivable and good will for $______________.

What did you originally invest $__________________.

18. Present margin______________

Annual sales $______________ Gallons_________________________

Profits $__________________

Debts $____________________

19. Debt-equity or debt-total assets ratio________________________

Rate of return on total assets or net worth___________________

Break even point____________________________________________

Assessed valuation__________________________________________

20. Comments - Closures, Competitors, bottom loading, etc.

# APPENDIX E
## LIST OF FIRMS AND PEOPLE CONTACTED

The following is a list of governmental agencies, industry associations and firms contacted:

1. Governmental Agencies

D. Andrew, Maryland State Bureau of Air Quality and Noise Control, Baltimore, Md.

C. Carr, Region III, U.S.E.P.A., Philadelphia, Pa.,

D. Gaston and J. Alexander, Jr., Virginia State Air Pollution Control Board, Falls Church, Va.

S. Krause, Council of Governments, Washington, D.C.

D. Wambsgans, District of Columbia Bureau of Air and Water Quality Control, Washington, D.C.

O. Cabra, EPA, Region VI, Dallas, Texas

R. Brown, EPA, Region VI, Dallas, Texas

R. Anderson, Texas Air Control Board, Houston, Texas

K. Wade, Texas Air Control Board, Austin, Texas

C. Miller, Harris County Pollution Control Dept. Houston, Texas

L. Randell, Fuels Tax Division, Texas State Controllers Office, Austin, Texas

Staff, City of Houston Pollution Control Division, Houston, Texas

2. Industry Associations

S. McCully, Jr., Maryland Oil Jobbers Council, Camp Springs, Md.

E. Catterton, Virginia Petroleum Jobbers Association., Richmond, Va.

P. Dudley and H. Smith, Jr., Texas Oil Marketers Association, Austin, Texas

3. Bulk Plant Operators

A. Lawless III, Rockville, Md.

D. Bare, Westminster, Md.

P. Johnson, Havre de Grace, Md.

Mr. Clark, Phoenix, Md.

3. Bull Plant Operators (continued)

Mr. Corbin, Bel Air, Md.
J. Coulter, Bel Air, Md.
J. McCanney, Westminster, Md.
D. Hawkland, Havre de Grace, Md.
J. Gilbert, Havre de Grace, Md.
W. Carroll, Aberdeen, Md.
E. Palmer, Westminster, Md.
H. Schwarzschild, Owings Mill, Md.
C. Biles, Gaithersburg, Md.
R. Peterson, Westminster, Md.
W. Walsh, Hampstead, Md.
W. Wilhelm, Randallstown, Md.
J. Hawkins, Westminister, Md.
R. Jackson, Annapolis, Md.
R. Fairbanks, Edgewater, Md.
F. Hollifield, Annapolis, Md.
O. Hall, Leesburg, Va.
Mr. Hawkins, Alexandria, Va.
J. Oyler, Leesburg, Va.
Mr. Rose, Middleburg, Va.
F. Moorcones, Purcellville, Va.
R. Robertson, Fairfax, Va.
J. Cooper, Purcellville, Va.
W. Holtzman, Mt. Jackson, Va.
D.D. Clark, Alvin, Texas
G. Warfield, Alvin, Texas
G. Monteau, Alvin, Texas
B. Magness, Angelton, Texas
R.B. Stewart, Angelton, Texas
Mr. Miguez, Winnie, Texas
Pat McGowan, Winnie, Texas
D.G. Thompson, Katy, Texas

3. Bulk Plant Operators (continued)

Mr. Bernhausen, Rosenburg, Texas
Mr. Krolcyzk, Rosenburg, Texas
C. Foss, Rosenburg, Texas
J. Armstrong, Sugar Land, Texas
R. Kuhn, Galveston, Texas
L. Enderli, Baytown, Texas
Mr. Barrow, Baytown, Texas
D. Trigg, Baytown, Texas
H. Smith, Jr., Houston, Texas
B. Glaw, Houston, Texas
J. Herbert, Liberty, Texas
Mr. Silhavy, Liberty, Texas
Mr. Evans, Bay City, Texas
J. Kovar, Bay City, Texas
J.D. Berryman, Bay City, Texas
E. Nedbalek Bay City, Texas
J. Stubbs, Conroe, Texas
T.C. Brannon, Conroe, Texas
R. Clanton, Conroe, Texas
B. Pursley, Conroe, Texas
J.C. Hicks, Hempstead, Texas

4. Major Oil Company Contacts

Pepper Massengale, Mobil Oil Co., Houston, Texas
Pat Cotton, Ada Oil Co., Houston, Texas
Clarence Hysmith, Exxon Co., Houston, Texas
E.W. Berry, Exxon Co., Houston, Texas
Lee Kleypas, Exxon Co., Dallas, Texas
E.E. Carroll, Texaco Oil Co., Houston, Texas
R. Page, Southern States Cooperative, Inc., Richmond, Va.
George Johnson, Gulf Oil Corporation, Houston, Texas
J.L. Golueke, Amoco, Inc., Baltimore, Maryland
D.L. Adams, Friendly Oil Co., Inc. Havre de Grace, Maryland

5. Other interested parties

M. Miller, U.S., FEA, Los Angeles, California

W. Moore, Emco Wheaton, Conneaut, Ohio

J. Parks, OPW, Cincinnati, Ohio

J. Barnes, Huddleston Equipment Co. Los Angeles, California

Andrews Mfg. Co., Dayton, New Jersey

# APPENDIX F
# FINANCIAL ANALYSIS

# FINANCIAL ANALYSIS EXCERPTED FROM "ECONOMIC ANALYSIS OF VAPOR RECOVERY SYSTEMS ON SMALL BULK PLANTS"

## 6. MARKET ANALYSIS OF BULK PLANTS

Bulk plants operate in market environments that vary in competition due to the make up of their respective customer sets. These markets range from being virtually monopolistic to being highly competitive. Consequently, a bulk plant operator must react in a manner that is sensitive to his environment while considering the range of alternatives available to his customers.

Both bulk plant operators and their customers are prepared to modify their actions to take advantage of changing market conditions. The operators will seek to raise prices and curtail services in order to maintain or increase profit margins. On the other hand, their customers will seek to obtain special services and lower prices for gasoline. The degree of existing competition will be the major determinant in resolving this conflict.

A principal aspect of the bulk plant business that appears to be self-evident is that the field lacks consistency. As implied previously, there are several owner/operator situations within the industry. Additionally, competition is increasing from other methods of marketing gasoline. These methods include direct dealers and pipeline facilities.

For any particular operator, there are relevant factors that affect his business and have a major influence on its conduct. These factors will certainly include the following:

- Relationship with his supplier
- Efficiency of his plant
- Size of his customers
- Distance traveled to his customers
- Extent of direct competition
- Governmental regulations

These factors will affect both his gross profits and net profits. For example, if the operator's customers are relatively distant his delivery costs will be high. If he has many small customers, costs per delivery will be higher than if he had a few large customers.

Bulk plant suppliers may not sell gasoline to all of their customers at the same price. According to industry practice, an operator will be able to purchase product from his supplier at a lower price if he incurs higher than normal expenses in servicing his customers. In a sense, the operator is being subsidized by his supplier in order to sell gasoline to a particular group of customers at a given price.

During this study, the question has been raised of independent operators receiving subsidies for other situations beyond their control, such as the installation of vapor recovery equipment. The almost universal response from both operators and suppliers was that a lump sum type of assistance could not be expected.

The operators seem to be left with three possible alternatives: 1) either absorb the added costs, 2) seek lower supply prices, or 3) raise delivery prices. An increase in the price of gasoline raises the further question of an accompanying decrease in demand and the possible substitutions available to consumers seeking to purchase gasoline at lower prices.

Economically, direct supply is viable only for individual customers located relatively short distances from refineries. If long distances must be traveled for any deliveries, costs will begin to escalate rapidly for individual small users. Large users, those with at least 8,000 gallon (30,000 liter) tanks, are likely to deal with direct bulk sellers or hire trucks to provide deliveries from the refinery to his facility, bypassing the bulk plant.

# 7. FINANCIAL ANALYSIS

## 7.1 FINANCIAL DATA AND STATISTICS

Determining the financial structure and capability of typical bulk plants is a very difficult matter. Many of these firms are in businesses other than just the wholesale marketing of gasoline. They sometimes own gasoline stations and sell tires, batteries and accessories (TBA) in addition to gasoline and other petroleum products. It is also quite difficult to define what one means by typical in terms of location, customer set, sales volume, additional lines of business, profitability and asset value.

Many firms, both large and small are reluctant to freely disperse their annual financial data. Nevertheless, sources for this information are available through Dun and Bradstreet and Robert Morris Associates (RMA). The former provides banks, insurance companies and other institutions with financial data, corporate histories and ratings for numerous companies. PES has obtained several of these reports for firms in the bulk plant business.

Robert Morris Associates is a service that publishes summary data for groups of companies within most Standard Industrial Classification (SIC) codes. For the bulk plant industry, SIC code 5171 was selected which is defined as follows:

> "Establishments primarily engaged in wholesaling petroleum products, including liquified petroleum gas, from bulk liquid storage facilities." *

RMA has collected financial data for 153 firms within this classification. As indicated above, the companies included in this listing are often in other related businesses in addition to the operation of bulk plants. RMA has published data for companies grouped according to their asset value. The groups consist of 18 companies with assets under $250,000, sixty-seven companies with assets of between $250,000 and $1,000,000, and fifty-nine firms with assets of between $1,000,000 and $10,000,000. In addition, significant ratios by statistical quartile have been computed for the companies within each asset grouping. These statistics are presented in Tables 7.1 and 7.2.

The ratios calculated in Table 7.2 are defined in Table 7.3. These ratios are commonly used to assess the financial capability and health of firms as compared to other organizations in the same industry.

Three numbers are depicted for each ratio in Table 7.2. These values represent the quartile points in each case. For example, if a group had 19 members, then the quartile points would define the values of the fifth, tenth and fifteenth members. It is clear from this discussion that management of any company in a given industry will attempt to keep their ratios away from the lowest quartile of any group as this might tend to indicate weakness. By having this type of data, management is able to measure its performance against others in the same industry.

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*Robert Morris Associates - Statement Studies, 1975

## Table 7.1 BALANCE SHEET AND INCOME STATEMENT FACTORS FOR WHOLESALERS OF PETROLEUM PRODUCTS

| | WHOLESALERS OF - PETROLEUM PRODUCTS<br>77 STATEMENTS<br>ENDED ON OR ABOUT JUNE 30, 1974<br>76 STATEMENTS<br>ENDED ON OR ABOUT DECEMBER 31, 1974 | | | |
|---|---|---|---|---|
| ASSET SIZE | Under $250K | $250K & Less Than $1MM | $1MM & Less Than $10MM | All Sizes |
| NUMBER OF STATEMENTS | 13 | 67 | 59 | 153 |
| **ASSETS** | % | % | % | % |
| Cash | 10.4 | 10.8 | 14.1 | 9.7 |
| Marketable Securities | .0 | 1.7 | .5 | 1.7 |
| Receivables Net | 27.6 | 27.7 | 23.6 | 24.4 |
| Inventory Net | 25.0 | 17.3 | 19.0 | 18.3 |
| All Other Current | 1.8 | 1.8 | 1.8 | 1.2 |
| Total Current | 64.8 | 59.4 | 59.0 | 55.4 |
| Fixed Assets Net | 28.5 | 33.2 | 34.4 | 38.4 |
| All Other Non-Current | 6.7 | 7.5 | 6.6 | 6.2 |
| Total | 100.0 | 100.00 | 100.0 | 100.0 |
| **LIABILITIES** | | | | |
| Due to Banks-Short term | 3.2 | 4.9 | 3.8 | 3.9 |
| Due to Trade | 18.6 | 20.0 | 23.0 | 22.3 |
| Income Taxes | 2.6 | 4.5 | 5.6 | 4.0 |
| Current Maturities LT Debt | 4.1 | 4.7 | 3.6 | 3.7 |
| All Other Current | 19.7 | 8.0 | 10.1 | 8.4 |
| Total Current Debt | 48.3 | 42.1 | 46.2 | 42.2 |
| Non-Current Debt. Unsub. | 10.4 | 17.7 | 16.5 | 18.1 |
| Total Unsubordinated Debt | 58.8 | 59.8 | 62.7 | 60.3 |
| Subordinated Debt | .0 | .9 | .4 | .3 |
| Tangible Net Worth | 41.2 | 39.4 | 36.8 | 39.4 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 |
| **INCOME DATA** | | | | |
| Net Sales | 100.0 | 100.0 | 100.0 | 100.0 |
| Cost of Sales | 82.6 | 81.9 | 84.5 | 78.4 |
| Gross Profit | 17.4 | 18.1 | 15.5 | 21.6 |
| All Other Expense Net | 13.9 | 14.8 | 10.6 | 14.8 |
| Profit Before Taxes | 3.5 | 3.3 | 4.8 | 6.8 |

Table 7.2 RATIO ANALYSIS FOR WHOLESALERS OF PETROLEUM PRODUCTS

Based on 153 statements ending during calendar year 1974

| Asset Size<br>RATIOS | Under $250M 18 | $250 and less than $1MM 67 | $1MM and less than $10MM 59 | All Sizes 153 |
|---|---|---|---|---|
| RATIOS<br>Quick | 1.0<br>.8<br>.5 | 1.2<br>.9<br>.7 | 1.2<br>.9<br>.6 | 1.2<br>.9<br>.6 |
| Current | 1.7<br>1.5<br>1.1 | 1.8<br>1.4<br>1.0 | 2.0<br>1.3<br>1.0 | 1.8<br>1.4<br>1.0 |
| Fixed/ Worth | .3<br>.7<br>1.0 | .4<br>.8<br>1.4 | .5<br>.9<br>2.0 | .5<br>.8<br>1.6 |
| Debt/ Worth | .7<br>1.3<br>2.7 | .8<br>1.5<br>2.9 | .9<br>1.6<br>3.3 | .8<br>1.6<br>3.1 |
| % Profit Bef. Taxes/ Worth | 85.8<br>28.5<br>6.6 | 50.3<br>35.2<br>19.3 | 60.3<br>33.3<br>23.0 | 60.7<br>35.2<br>20.3 |
| % Profit Bef. Taxes/ Tot. Assets | 25.5<br>16.4<br>3.8 | 18.4<br>11.4<br>7.0 | 18.4<br>12.9<br>7.4 | 19.2<br>12.9<br>7.2 |

The three values in each box represent the quartile points for each ratio and asset size.

## Table 7.3 DEFINITION OF RATIOS

### QUICK RATIO

Method of Computation: The total of cash, short-term marketable securities and net receivables for the industry composite was divided by the total of current liabilities.

Result: The ratio measures short-term liquidity available to meet current debt.

Principle: Also known as the "acid test" or "liquidity" ratio, it is of particular benefit to short-term creditors, as it expresses the extent to which cash and those assets most readily convertible into cash can meet the demands of current liabilities. Any value of less than 1 to 1 implies a reciprocal "dependency" on inventory or other current assets to liquidate short term debts.

### CURRENT RATIO

Method of Computation: The total of current assets for the industry composite was divided by the total of current liabilities.

Result: The ratio is one measure of the ability of the industry to meet its current debt.

Principle: In comparing an individual company to the industry, a higher current ratio indicates that more current assets are free from debt claims of creditors and prompter payment can be expected.

### FIXED/WORTH

Method of Computation: The net fixed assets (plant & equipment less reserve for depreciation) for the industry was divided by the tangible net worth.

Table 7.3 Definition of Ratios con't.

Result: The ratio expresses the proportion between investment in capital assets (plant and equipment) and the owners' capital.

Principle: The higher the ratio, the less owners' capital is available for working capital. The lower this ratio, the more liquid is the net worth and the more effective owners' capital is as a liquidating protection to creditors. The presence of substantial leased fixed assets--off the balance sheet--may deceptively lower the ratio.

DEBT/WORTH

Method of Computation: The total debt for the industry composite was divided by the tangible net worth.

Result: The ratio expresses the relationship between capital contributed by creditors to owners' capital--"what is owed to what is owned."

Principle: Total assets or resources represent the entire capital at the disposal of a given company and consist of net worth or owners' capital, and creditor capital--that provided by those outside the business for temporary use. The proportion existing between debt and worth--or leverage--records the debt pressure. The lower the ratio, the easier the pressure and the greater the protection for creditors.

PROFITS BEFORE TAXES/WORTH

Method of Computation: The amount of net profit before taxes was divided by the tangible net worth.

Table 7.3 Definition of Ratios con't.

Result: The ratio expresses the relationship between the owners' share of operations before taxes for the year and the capital already contributed by the owners.

Principle: Capital is usually invested in a company in the anticipation of a return on that investment--in the form of a profit. This hope of a profit is the attraction for original and new capital. The higher the profit before taxes to worth, the greater is the probability of making appreciable addition to owners' capital after payment of dividends and taxes.

PROFITS BEFORE TAXES/TOTAL ASSETS

Method of Computation: The amount of net profit before taxes of the industry were divided by the total assets for the industry.

Result: The ratio expresses the owners' share of the year's operations before taxes related to the resources contributed by both owners and creditors.

Principle: The relationship indicates the net profitability of the use of all resources of the business.

## 7.2 FINANCIAL STATEMENT SUMMARY

Each industry tends to exhibit different types of financial statements. For example, the firms in one industry may have a large percentage of fixed assets while another industry may show more current assets. On the liability side as well, firms within an industry will show similarities and will tend to differ in the degree of various elements. Consequently, it is extremely difficult to compare firms in various industries. The common practice is to assess how any given firm in an industry compares to the averages and standards developed for that industry.

By reviewing the data for the balance sheets and income statements given in Table 7.1, some general statements can be made about the data summarized for the industry. Most of the data shown is representative of firms with at least $250,000 in assets. The smaller companies have a greater percentage of current assets than the larger firms with differences appearing primarily in a higher percentage of fixed assets in inventories and a low percentage of assets. On the liability side of the balance sheet, a reasonably large disparity between the smaller and bigger firms is apparent in the percentage of non-current debt. This fact reflects the greater difficulty in most industries of small firms to obtain long term debt.

One further point should be made regarding financial data on balance sheets. According to generally accepted accounting principles, fixed assets always reflect historical cost rather than their current market values. Therefore, the balance sheet of a company may not truly reflect the actual financial capability of the firm. For example, a small bulk plant may have been purchased thirty years ago and the recorded land value will reflect its actual cost at that time. In the intervening period, the market value of the land may have increased substantially but the firm's balance sheet and accounting records will continue to carry this asset at its original cost.

## 7.3 INVESTMENT IN VAPOR RECOVERY SYSTEMS

The approach to be taken in the following discussion will be to assess the impact of several expenditure levels for vapor recovery equipment on firms of various asset values and sales. As can be expected, within each group of companies, an irregular ability to accept costs of a given amount will be exhibited. The PES approach will be to evaluate the impact of varying expenditures on average firms of several sizes (as represented by data in Table 5.1) and assess the new quartile position of this firm (as represented by the data in Table 5.2). If any expenditure causes the firm to show drastic and unfavorable changes in particular ratios, it can be concluded that the expenditure will have an adverse effect on the enterprise. This is due to the fact that such changes indicate the probable existence of strains on the financial capabilities of the firm in such areas as availability of capital, profitability and borrowing potential.

The analysis described below will concentrate on firms with assets of between $50,000 and $750,000, and will be concerned principally with the debt structure, working capital position and profitability of an enterprise. These firms can be expected to require an investment of at least $10,000 for installation of a top loading vapor balance at plant sites and for modification of their delivery trucks. Although it is recognized that some plants may need to convert their own transports, this $5,000 expenditure (approximate) is not being included as a cost of installing vapor recovery equipment. Also, plants which elect to convert to bottom loading at a cost in excess of $30,000 will be considered as voluntarily making this expenditure as a facility modernization.

## 7.4 SOURCES OF CAPITAL

Most companies in the asset range being considered will be unable to raise the needed capital internally and will have to seek outside sources of funds. The most likely organizations available to provide this assistance will be banks. Other assistance may be expected from the Small Business Administration (SBA) and the Pollution Control Financing Authority (PCFA) in most states. The latter have been organized to provide low interest loans to industry in order to purchase and install pollution control equipment. However, only in the State of California has this organization been specifically attempting to assist small businesses.

On June 4, 1976 President Ford signed Senate Bill 2498 into law (Public Law 94305) which provides the SBA with the capability to guarantee contracts that the California PCFA has with businesses including loan agreements. These contracts are then used as security to sell tax exempt bonds primarily to banks who make loans to firms needing to install pollution control equipment at reduced rates. If this program proves successful, it will probably be expanded to other sections of the ocuntry.

When a potential borrower seeks a loan, he must demonstrate to his bank that he possesses the capacity to repay the principal and interest in a reasonable time period. If he cannot demonstrate this fact, neither the SBA nor the PCFA can grant him a loan. His credit worthiness is determined solely by his bank.

In most usual circumstances, banks will make equipment loans for a period of three to five years at the prevailing rate of interest. This rate is presently about 11%, however, it is subject to change depending on the size of the loan, the type of equipment and the credit worthiness of the borrower. If the loan applicant qualifies under SBA or PCFA criteria, he could obtain a loan for eight or more years at an interest rate that is three or four percent below the prevailing rate.

Recently, the SBA has also recognized the special hardships that can be created for small businesses in meeting air pollution regulations. Accordingly, a program of air pollution control loans has been instituted. Further information pertaining to this program, was provided in Reference 1.

### 7.5 ANALYSES OF FINANCIAL CAPABILITY

In order to assess the financial capability of typical small firms in the industry, seven pro-forma balance sheets and income statements have been created for enterprises with selected levels of assets and sales. These statements, as shown in Table 7.4 represent companies with assets ranging from $50,000 to $750,000 and with total annual sales between $150,000 and $2,500,000. These statements were developed from the data provided in Tables 7.1 and 7.2.

From these data, ratios for total debt/net worth of the seven typical companies have been generated assuming different levels of vapor recovery expenditures. These new ratios are shown in Table 7.5 for two cases. In the first case the loan is made for 80% of the designated amount - a 20% down payment being required. The second case shows 100% financing available, because of guarantees by the SBA or the California PCFA. When the debt/net worth ratio reaches the 2.5 area, it indicates that the firm is maintaining a high proportion of debt. At this point creditors of this company will begin to become concerned about its credit worthiness. Any additional borrowing will become extremely difficult unless the debt/net worth ratio can be reduced. For this reason a ratio of 2.2 will be considered as a desirable maximum.

Working capital must also be considered in order to assess the capability of an enterprise to make a down payment, if necessary, and continue in operation while paying off the loan. Quite clearly, all working capital cannot be diverted to loan purposes. For this exercise let us assume that 50% of working capital can be diverted.

## Table 7-4. PRO FORMA BALANCE SHEETS AND INCOME STATEMENTS FOR BULK PLANTS OF VARIOUS SIZE ASSETS

| ASSET SIZE | $50,000 | $100,000 | $150,000 | $200,000 | $300,000 | $500,000 | $750,000 |
|---|---|---|---|---|---|---|---|
| BALANCE SHEETS | | | | | | | |
| Assets | | | | | | | |
| Cash | 5,200 | 10,400 | 15,600 | 20,800 | 32,400 | 54,000 | 81,000 |
| Marketable Securities | | | | | 5,100 | 8,500 | 12,750 |
| Receivable Net | 13,800 | 27,600 | 41,400 | 55,200 | 83,100 | 138,500 | 207,750 |
| Inventory Net | 12,500 | 25,000 | 37,500 | 50,000 | 51,900 | 86,500 | 129,750 |
| Other Current Assets | 900 | 1,800 | 2,700 | 3,600 | 5,400 | 9,000 | 13,500 |
| Total Current Assets | 32,400 | 64,800 | 97,200 | 129,600 | 178,200 | 297,000 | 445,500 |
| Fixed Assets Net | 14,250 | 28,500 | 42,750 | 57,000 | 99,600 | 166,000 | 249,000 |
| Other Non-Current Assets | 3,350 | 6,700 | 10,050 | 13,400 | 22,500 | 37,500 | 56,250 |
| TOTAL ASSETS | 50,000 | 100,000 | 150,000 | 200,000 | 300,000 | 500,000 | 750,000 |
| LIABILITIES | | | | | | | |
| Accounts Payable | 9,300 | 18,600 | 27,900 | 37,200 | 60,000 | 100,000 | 150,000 |
| Short Term Bank Loans | 1,600 | 3,200 | 4,800 | 6,400 | 14,700 | 24,500 | 36,750 |
| Income Taxes Payable | 1,300 | 2,600 | 3,900 | 5,200 | 13,500 | 22,500 | 33,750 |
| Current Maturities - Long Term Debt | 2,050 | 4,100 | 6,150 | 8,200 | 14,100 | 23,500 | 35,250 |
| Other Current Liabilities | 9,850 | 19,700 | 29,550 | 39,400 | 24,000 | 40,000 | 60,000 |
| TOTAL CURRENT LIABILITIES | 24,150 | 48,300 | 72,450 | 96,600 | 126,300 | 210,500 | 315,750 |
| Non-Current Debt-Unsubordinated | 5,200 | 10,400 | 15,600 | 20,800 | 53,100 | 88,500 | 132,750 |
| Subordinated Debt | | | | | 2,700 | 4,500 | 6,750 |
| TOTAL LIABILITIES | 29,400 | 58,800 | 88,200 | 117,600 | 181,800 | 303,000 | 454,500 |
| TANGIBLE NET WORTH | 20,600 | 41,200 | 61,800 | 82,400 | 118,200 | 197,000 | 295,500 |
| TOTAL LIABILITIES & NET WORTH | 50,000 | 100,000 | 150,000 | 200,000 | 300,000 | 500,000 | 750,000 |
| INCOME STATEMENTS | | | | | | | |
| Net Sales | 150,000 | 300,000 | 500,000 | 700,000 | 1,000,000 | 1,600,000 | 2,500,000 |
| Cost of Sales | 123,900 | 247,800 | 413,000 | 578,200 | 819,000 | 1,310,400 | 2,047,500 |
| Gross Profit | 126,100 | 52,200 | 87,000 | 121,800 | 181,000 | 289,600 | 452,500 |
| Other Expenses | 20,850 | 41,700 | 69,500 | 97,300 | 148,000 | 236,800 | 370,000 |
| Profit Before Taxes | 5,250 | 10,500 | 17,500 | 24,500 | 33,000 | 52,800 | 82,500 |
| Taxes | 1,155 | 2,310 | 3,850 | 5,390 | 7,260 | 12,344 | 26,600 |
| Net Profit | 4,095 | 8,190 | 13,560 | 19,110 | 25,740 | 40,456 | 55,900 |

Table 7.5 TOTAL DEBT/NET WORTH RATIOS FOR TYPICAL FIRMS OF VARIOUS ASSET SIZES AND EXPENDITURE LEVELS

Bank Loans @ 80% of Expenditure (20% Down Payment)

| ASSETS<br>EXPENDITURE | $50K | $100K | $150K | $200K | $300K | $500K | $750K | Down Payment |
|---|---|---|---|---|---|---|---|---|
| $0 | 1.3 | 1.3 | 1.3 | 1.3 | 1.5 | 1.5 | 1.5 | |
| 10K | 1.8 | 1.6 | 1.6 | 1.5 | 1.6 | 1.6 | 1.6 | $2K |
| 20K | 2.2 | 1.8 | 1.6 | 1.7 | 1.6 | 1.6 | 1.5 | $4K |
| 30K | 2.6 | 2.0 | 1.8 | 1.7 | 1.7 | 1.7 | 1.6 | $6K |
| 50K | 3.4 | 2.4 | 2.1 | 1.9 | 1.9 | 1.7 | 1.7 | $10K |
| 75K | | 2.9 | 2.4 | 2.2 | 2.0 | 1.8 | 1.7 | $15K |
| 100K | | 3.4 | 2.7 | 2.4 | 2.2 | 1.9 | 1.8 | $20K |
| 125K | | | 3.0 | 2.6 | 2.4 | 2.0 | 1.9 | $25K |

SBA and PCFA Loans @ 100% of Expenditure

| ASSETS<br>EXPENDITURE | $50K | $100K | $150K | $200K | $300K | $500K | $750K |
|---|---|---|---|---|---|---|---|
| $0 | 1.3 | 1.3 | 1.3 | 1.3 | 1.5 | 1.5 | 1.5 |
| 10K | 1.9 | 1.7 | 1.6 | 1.5 | 1.6 | 1.6 | 1.6 |
| 20K | 2.4 | 1.9 | 1.8 | 1.7 | 1.7 | 1.6 | 1.6 |
| 30K | 2.9 | 2.2 | 1.9 | 1.8 | 1.8 | 1.7 | 1.6 |
| 50K | 3.9 | 2.6 | 2.3 | 2.0 | 2.0 | 1.8 | 1.7 |
| 75K | | 3.3 | 2.6 | 2.3 | 2.2 | 1.9 | 1.8 |
| 100K | | 3.9 | 3.1 | 2.6 | 2.4 | 2.0 | 1.9 |
| 125K | | | 3.4 | 2.9 | 2.6 | 2.2 | 2.0 |

Many organizations are likely to find this amount too high and could result in causing them cash flow difficulties. Nevertheless, 50% appears to be a reasonable jumping off point.

With this factor in mind, one can estimate the maximum loan a firm can undertake based solely on working capital from banks or through the SBA or PCFA for the seven typical companies as follows:

| Asset Size | 50% of Working Capital | Maximum Bank Loan | Maximum SBA or PCFA Loan |
|---|---|---|---|
| $ 50,000 | $ 4,125 | $ 0 | $ 25,000 |
| 100,000 | 8,250 | 15,000 | 50,000 |
| 150,000 | 13,375 | 30,000 | 75,000 |
| 200,000 | 16,500 | 35,000 | 100,000 |
| 300,000 | 25,950 | 60,000 | 150,000 |
| 500,000 | 43,250 | 100,000 | 150,000 |
| 750,000 | 64,875 | 150,000 | 150,000 |

Since a minimum of $10,000 is considered necessary for installation of a complete vapor recovery system for incoming and outgoing loads, any acceptable loan below this amount is shown as zero. Additionally, SBA and PCFA loans of larger amounts can be supported since they may not require down payments, and are to be repayed over longer time periods at lower interest rates.

Finally, profitability must be considered since the enterprise must generate the earnings to replenish working capital and make loan payments. Realistically, no lender will be confident in making a loan unless principal and interest payments are covered by the potential earnings of the enterprise. Accordingly, the firm's net income will determine the amount of loan that may be granted.

Under usual circumstances, an investment in plant and equipment is made in order to replace worn out facilities, modernize the establishment, or improve operating efficiencies. The result of this type of investment is reasonably expected to be increased profitability. It is these higher profits that are then used to repay the principal and interest of any loan undertaken for the purpose of making this investment. In the case of vapor recovery, this scenario cannot be expected. Rather, any debt incurred for the purpose of meeting vapor recovery regulations will have to be honored from non-rising profits.

The profits of any business are used to provide a return to its owners and for reinvestment in the business. Consequently, it is unreasonable to expect that all of the profits of the business should be employed for vapor recovery purposes. Every company must constantly reinvest in its plant and equipment in order to maintain adequate operations.

Again, let us assume that no more than 50% of after tax profits can be utilized for loan repayment. This procedure provides for a minimum level of profits to be used for purposes unrelated to the vapor recovery installation.

Given this background, the maximum loans that can be expected for the seven typical companies are as follows:

| Asset Size | 50% of After Tax Profits | Bank Loan | SBA or PCFA Loan |
|---|---|---|---|
| $ 50,000 | $ 2,000 | $ 0 | $ 0 |
| 100,000 | 4,000 | 15,000 | 20,000 |
| 150,000 | 6,800 | 30,000 | 35,000 |
| 200,000 | 9,500 | 45,000 | 60,000 |
| 300,000 | 12,750 | 60,000 | 75,000 |
| 500,000 | 20,000 | 90,000 | 120,000 |
| 750,000 | 28,000 | 125,000 | 150,000 |

These estimates have been based solely on the amount that can be repaid from previous year's profits and do not include the effect of any special tax incentives.

Tax incentives may have a significant impact for many companies contemplating a vapor recovery investment. In this connection, the Internal Revenue Code includes special provisions for firms, and especially small businesses purchasing and installing certified pollution control facilities. In addition to all interest payments being deductible expenses for tax purposes, Section 169 of the code permits a rapid write-off of such certified investments. Under this regulation a company may choose to depreciate its newly acquired facility over a sixty-month period instead of over its useful life. Employing the straight-line depreciation method, 20% of the cost of this investment could be deductible for five years.

Sections 46 and 50 of the code deal with the subject of investment tax credits. Under the 1975 provision, all businesses may credit 10% of the cost of equipment with a depreciable life of at least seven years to their actual tax liability. Lesser percentages may be created for equipment depreciated over a minimum period of three years to a maximum of six years. The purpose of this regulation is to provide businesses with added incentives to purchase equipment.

Finally, Sections 179 of the code furnishes small business with an additional opportunity to reduce their taxes. It permits an added first year bonus depreciation allowance equal to 20% of the purchase price of the equipment.

Accordingly, a small business will be able to deduct its interest expense plus almost 50% of the purchase and installation price of certified pollution control equipment, depending on the depreciation method used. Other businesses will be able to deduct 30% plus interest charges.

The primary benefit resulting from these incentives will be a reduction in the tax burden on the affected companies. Consequently, firms with little or no profits will accrue only minor assistance from these regulations. For firms enjoying profits, they will benefit from sharply reduced tax expenses and an increased cash flow. The latter will provide additional security to financial institutions contemplating loans to the firm and may result in the business being able to spend larger sums on pollution control equipment.

### 7.6 DETERMINATION OF LOAN LIMITS

In order to be eligible for a loan, a company must be able to demonstrate that its financial structure is able to absorb additional borrowing, that it possesses the working capital to make the required down payment and pay the associated fees, and that it has the earnings capacity to maintain its financial capability and retire the loan. These aspects have been considered above for our typical companies in relation to various size loans. We can now combine the results above and determine approximately the maximum amount each size firm can be expected to borrow.

This estimate has been calculated by computing the minimum acceptable loan amount for each size company and then choosing the smallest amount in each group. The data resulting from this procedure are shown in Table 7.6. The amount that can be borrowed for each asset group is then equal to the smallest value in that group as follows:

| Asset Size | Net Sales Dollars | 80% Bank Loan | 100% SBA or PCFA Loan |
|---|---|---|---|
| $ 50,000 | $ 150,000 | $ 0 | $ 0 |
| 100,000 | 300,000 | 15,000 | 20,000 |
| 150,000 | 500,000 | 30,000 | 35,000 |
| 200,000 | 700,000 | 35,000 | 60,000 |
| 300,000 | 1,100,000 | 60,000 | 75,000 |
| 500,000 | 1,600,000 | 90,000 | 120,000 |
| 750,000 | 2,500,000 | 125,000 | 150,000 |

It should be reemphasized that these amounts reflect estimated maximum investments for the typical firms based on the specified assumptions. These assumptions are believed to reasonably reflect the real world situation, but they are susceptible to reinterpretations.

Table 7.6 ACCEPTABLE LOAN AMOUNTS BY FACTOR

80% - Bank Loan

| FACTOR<br>ASSET SIZE | Debt | Working Capital | Profitability |
|---|---|---|---|
| K$ | K$ | K$ | |
| 50K | 20K | 0 | 0 |
| 100K | 40K | 15K | 15K |
| 150K | 60K | 30K | 30K |
| 200K | 75K | 35K | 45K |
| 300K | 100K | 60K | 60K |
| 500K | 150K | 100K | 90K |
| 750K | 150K | 150K | 125K |

100% - SBA or PCFA Loan

| FACTOR<br>ASSET SIZE | Debt | Working Capital | Profitability |
|---|---|---|---|
| K$ | K$ | | |
| 50K | 15K | 25K | 0 |
| 100K | 30K | 50K | 20K |
| 150K | 45K | 75K | 35K |
| 200K | 70K | 100K | 60K |
| 300K | 75K | 150K | 75K |
| 500K | 125K | 150K | 120K |
| 750K | 150K | 150K | 150K |